E. I. du Pont de Nemours & Co
Dyestuffs Department
Wilmington, Del.

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In 2 Sections
Section 1

IN THIS ISSUE

The "Off" Week
"Act II, Scene 2: The Wharf"—A Problem in Nomenclature—Why You Should Be Active While Congress Is Idle

Sensitiveness, and Such
An Editorial

Jigger Dyeing

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AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

"Circulated Everywhere Dyestuffs Are Used"

In Two Sections—Section One

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THE "OFF" WEEK

"Act II, Scene 2: The Wharf"—A Problem in Nomenclature —Why You Should Be Active While Congress Is Idle

NOT that it registers any Great Moral Lesson, but merely by way of maintaining the continuity of things, we feel obliged to record that apparently a brand-new actor has stepped into the cast of the uproarious comedy, "The Vanishing Dye Experts," or, "Now You See 'Em and Now You Don't."

The last time the roll was called, two weeks ago, the *dramatis personae* lined up something like this: Drs. Joseph Flachslander and Otto Runge were here, carrying on their hideous, heinous and horrific spells and incantations behind armored walls in Wilmington; Dr. Heinrich Jordan had been arrested in Holland by a German sleuth while trying to get across the border into Belgium and was preparing to contest the suit of the Bayer Company, which had charged him with about everything it could think of, from hangnails to being a Sinn Feiner; while Dr. Max Engelmann, the other refugee, who was thought to be dodging about among the windmills of Holland, had disappeared most mysteriously and completely, *spurlos versenkt*—"leaving no trace."

Now then, who do you s'pose came down the gangplank of the staunch and seaworthy *Duca d'Aosta*, the Royal Italian Mail liner, when it tied up to its wharf in New York harbor last week? Why, nobody else but Herr Gustave MacDonald, "a well-known dye engineer of the Bayer Work, of Elberfeld, Germany"—if you can believe the New York "Evening Telegram"!

But can you? We must confess that when our eye first lighted on "Herr MacDonald" in the columns of that daily, we experienced much the same shock that followed when we first read of Mike Gilhooley, the youthful *Belgian* stoaway, who figured so prominently in the newspapers last year. The reported name and nationality of "Mike," however, proved to be perfectly accurate and susceptible of logical explanation—but "Herr MacDonald"! There is hardly enough

cohesive power in *that* combination to hold it together; it seems as though it must crumble and disintegrate if subjected to much handling. In fact, it gives every evidence of being ready to fly apart with almost explosive violence if even so much as touched with the pointed end of a doubt. Having served our term in a newspaper office and being aware of the chances for error arising from a foreign brand of articulation in conjunction with the subsequent use of the telephone and the hasty transference of a "story" from the "leg" man to the "re-write" man, and being further aware of the German pronunciation of "Max" as "Mocks," we are already sixty-five to seventy per cent persuaded that the gentleman with the reported Scotch-Irish name may turn out to be, after all, none other than the vanishing Max Engelmann.

Not, as we hinted before, that it is Vitally Important. If this attempt to connect the latest arrival with the chemist who gave the slip to the German authorities in Holland seems too weak for consideration, forget it. We shall know soon enough anyway. But if you like to pass a few moments in idle reflection upon the subject—as we must admit we do—then, no doubt, you will be interested in later developments leading up to the Great Unmasking scene in Act III.

At all events, the gentleman is here, and up to the hour of starting The Reporter on its way to gladden the hearts of its intelligent and discriminating readers, no further information had been vouchsafed. We might use up considerable space in making out a strong case for our theory, citing piquant and engaging analogies from our personal experiences—but to what end? You know our methods, Watson; you know our methods; you have only to apply them!

"Herr MacDonald," states the "Telegram," "declared the German authorities were loath to have him come here." That's a good word. "loath," but it seems pale and scrawny when confronted with the task of expressing what the German authorities felt. They were so "loath" to let him come here that we'll wager an inspection of "Mac's" coat-tails would reveal a state of affairs akin to the condition of the loose end of a locomotive "special" flag after having done duty through several hard seasons. The account did not state that the dye chemist was breathing hard and casting furtive glances over his shoulder from time to time, nor that he started violently when one of the ship-news reporters tapped him on the arm to attract his attention, but it did announce gravely that he had come here "to go to the American Dye Industry, a du Pont controlled organization, of Wilmington, Del."

Will "G. E. T." please say something funny about this! It looks as though Charles Spalding Thomas, of Washington and Colorado, finding himself suddenly eliminated from the Senatorial scheme of things, had taken up journalism and was now working as a news-gatherer for the "Telegram." If somebody will only send him a clipping of that, Mr. Thomas will be glad to write an eight-day letter to his former pals in the National Capitol, the dominant strain of which would be: "What Did I Tell You!"

Meanwhile, what is to be said of the Worcester (Mass.) "Gazette," which comes out with a rough editorial headed "Give 'Em the Gate"? "'Em" means Drs. Runge and Flachslander. Reacting to Dr. Herty's editorial, this newspaper says chattily, but with charming frankness, that "We do many fool things in the United States, many fool things."

We'll say we do, and because we aren't satisfied with our own efforts we elect a Senate to think up additional fool things to do. We hire these Senators to go down to Washington and botch up one of the most important questions of national defense now before us—to make a political battledore-and-shuttlecock out

of it instead of treating it at least in a dignified manner. But we are just short of being as foolish as the Massachusetts editor would have us be when, after quoting from Dr. Herty's editorial, he winds up with the interpretative command: "In other words, give 'em the gate."

Some day we may be privileged to print the final editorial in what now promises to be a whole series in The REPORTER. And the editorial can appropriately be headed "Act III, Scene 3: The Gate." But for reasons which have been stated hereinbefore, we believe that the present is not propitious. There is much to be done first, and if the textile industries can see no reason for giving reparations colors the gate, we can see no reason yet for giving the makers of them the gate. True, expert chemical knowledge was not specified as part of the reparations to be exacted from Germany, and Germany might have argued still longer over the terms of the Treaty had the Allies made such a demand, but since it is available and promises to aid in placing us beyond the need of reparation or any other colors from abroad, then let us make use of it to the fullest extent. Both chemists and colors are equally the product of the system which first produced poison gas and introduced it into warfare, and any odium which attaches to one belongs equally to the other. In order for us to be consistent, the imported chemists should only be escorted to a gate which can afterwards be closed against any further shipments of German dyestuffs into this country.

This is an off week, or you may be sure you would never have seen the relatively unimportant question of the imported German dye chemists occupying so much space. The old Congress has gone out, and the new will not gather to take its place until next Monday. Things are at a standstill so far as legislation is concerned, but at this time they should not be at a standstill in the dye industry. Once again we have been granted a period of grace in which to prepare for a struggle. It should not be neglected, for the coming battle with the forces of apathy, stupidity and downright pro-German interests will without doubt be the supreme one. Hence, while maintaining its original position with regard to the du Pont chemists, The REPORTER desires coincidentally to express the earnest opinion that now or never must every energy be applied to making ready for the final effort. Now or never must all our reserve forces be gathered and massed on the Washington front. Congress *must* be made to see the immediate necessity of immediate action, and the overwhelming folly of further ignoring facts which cannot but be so plain by this time that the veriest dunce could comprehend them.

What do you read in the news this week? For one thing you see with gratification that Joseph H. Choate, Jr., has repeated his effective address on the impossibility of disarmament

Amanil Colors for Cotton
Union Colors for Mixed Goods
Amacid Colors for Dress Goods

FOR MEN'S WEAR

Amacid Chrome Colors
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Alizarine Chrome Red
Alizarine Yellow
Alizarine Brown

Basic Colors

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Works: Nyack, N. Y.
Offices: Boston, Mass.
Philadelphia, Pa.
Danville, Va.
Chicago, Ill.

without first making sure of a self-contained dye industry, only obtainable through licensing. You observe that he chose an excellent body before which to express his thoughts—the Advertising Club, of New York—and that the newspapers were again generous with their space for a repetition of the arguments of the dye industry. All this helps to awaken the public.

Then you may also read that Representative Longworth has abandoned all hope of getting a licensing measure through Congress, and that he proposes to attach the Dye bill to the general chemical schedule in much the form in which it was presented to the House two years ago next month. You may blink your eyes a bit at that—and pass on.

Finally, you may read that Mr. Longworth, so far from receding from his first position, has instead actually advanced it considerably, to the extent that he is now firmly persuaded that the *only* means of saving the dye industry is by the licensing method, and that he intends to put up a stiff battle—if necessary—in order to get his bill through as amended by the Senate Finance Committee.

That is good news, that last—and it is accurate news. But you must not be content merely to read the news, however absorbing it may be. It must be part of your duty, from now until Congress meets—and after—to help *make* the news. You must help make the news which is presently to come out of Washington that Congress has passed the licensing measure, that the Senate has passed it, that President Harding has signed it!

This you can only accomplish by speaking. Use the mails for this purpose. You can speak in no more effective way to Congress than through the mails. We have said this many times before, and no doubt it is extremely tiresome for you to read the same plea again, especially if you have already written.

But if you know what will really help the cause, you will forget to be bored and *write again*. We do not know how to say more than this. Do it! It's all you can do, but it means, perhaps, more than you realize. Will you take our word for it? Be assured that the repetition alone adds strength to your letters. The mere quantity of mail received advocating the passage of the licensing system cannot but make a strong impression on Representatives and Senators alike.

The dye industry is using every means at its command to build itself up to a point where no protective measure other than an ordinary tariff will be needed. It must not be allowed to slip back at this stage of the game for want of proper support. That support must come from reader of The Reporter and many others in allied trades. And the most effective time to give that support will be the next few weeks—NOW, while the chemical schedule is in process of preparation, and LATER, while Congress is debating it.

ALLIED CHEMICAL & DYE VOTES TO INCREASE CAPITAL

The Allied Chemical & Dye Corporation stockholders have voted to increase the capital of the company from $48,043,675 to $113,043,675. This will increase the number of shares which the corporation may issue from 2,516,719 shares, of which 373,264 shares, of the amount of par value of $100 each, are preferred stock, and 2,143,455 shares are common stock without any nominal or par value to 4,166,719 shares, of which 973,264 shares of the amount or par value of $100 each are to be preferred stock and 3,143,455 shares are to be common stock without any nominal or par value.

Orlando F. Weber, president of the Allied Chemical & Dye Corporation, who presided as chairman at the special meeting, emphasized the point that no additional stock issue is now under consideration. He stated that

he authorized increase was made arge enough to obviate the necessity f repeated proceedings for future is-ues in the event any are required.

NEW BRANCH FOR CIBA CO.

The Ciba Company, Inc., has pened a new branch office at 26 Cus-om House Street, Providence, R. I., n charge of Ralph F. Culver, for-erly associated with Drake & Co., f Providence. The business of The iba Company in Rhode Island, Con-ecticut and a portion of Massachu-etts will be taken care of from this ffice, and stocks will be carried at rovidence.

U PONT ISSUES 1920 STATEMENT

Net earnings of $5,058,022 and ales of $93,983,291 are shown in the nnual report for 1920 of E. I. du ont de Nemours & Co. These fig-res compare with sales of $105,437,-3 and net earnings of $11,620,953 n 1919. Earnings applicable to com-on stock were $10,749,807, of which ,267,747 was paid in cash dividends. n addition, the undivided earnings erruing to the company through its ock holdings in subsidiary and ther companies, aggregated approx-nately $13,000,000, making a total of ,749,807, equivalent to approxi-ately $37.50 per share of common ock.

The company's suspended Govern-ent war contracts form a chapter of e report. There were thirty-seven of these claims, aggregating $26,375,-692, on December 31, 1920; but, by reason of advances from the United States for purchases of materials in claims, the net cash due the company was only $2,013,410.

As to twenty-one of the claims, aggregating $23,075,327, agreements have been reached with auditors and the local army boards showing that there is due the company in cash $345,693. The remaining sixteen claims, aggregating $3,300,365, on which there is $1,658,716 cash due the company, are still in process of settlement.

"NOT PREJUDICE, BUT BUSINESS"

British Chemical Manufacturer Says England Must Throw Off German Yoke

W. J. U. Woolcock, C.B.E., M.P., general manager of the Association of British Chemical Manufacturers, has issued a statement calling attention to the present position of the British fine chemical industry. "The next month or so," he says, "will decide whether, in the years to come, Great Britain is to make fine chemicals for all the world, or whether we and the other nations are once more to turn to Germany for our laboratory and photographic chemicals, for essential drugs like antipyrin, phenacetin, cocaine, salicylates, aspirin, salvarsan and others. The case

(*Concluded on page* 12.)

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AMERICAN DYESTUFF REPORTER
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A. P. HOWES, President
LAURANCE T. CLARK, Editor

Domestic subscription, including technical supplement in 9"x12" size once each month, $5 per year. Foreign, $6. Advertising rates on request.

SENSITIVENESS, AND SUCH

Our neighbor, "Drug and Chemical Markets," has been called to task by one of its readers for daring to print an editorial denouncing a retailer for labeling some of his goods "foreign dyed." The letter, which this excellent journal prints at the top of its correspondence column, is as follows:

"Editor, 'Drug and Chemical Markets':

"I have noticed on page 628 of your issue of March 23, the article entitled 'The New Attack on American Dyes.' I think there is a tendency to overdo this kind of thing. Your criticism is because certain department store advertisements featured 'foreign dyed' goods. If we display such an undue sensitiveness that we are constrained to howl to high heaven every time anything of this kind takes place, we shall do more harm than good.

"There have always been certain retail dealers, catering to a particular class of the community, who have always featured their goods as 'foreign' or as 'imported' thereby conveying the inference that imported goods are better than domestic. A very considerable section of the community having more money than brains, have been educated in this belief. Imported clothes, imported silks, imported shoes, have always commanded the preference of this class. Yet, the American manufacturers have never unduly opposed this tendency and have developed their manufactures in spite of it.

"It seems to me that if we go out of our way to attack this kind of thing, and to insist that no one shall, under any conceivable circumstances, venture to appeal to that class of the community which has always thought 'imported goods' to be better than home made goods, as far as dyes are concerned, we shall show weakness rather than strength.

"H. J. MacDonald."

It is, of course, inconceivable that the gentleman could be a relative of the "Herr MacDonald" told of in the "Evening Telegram" and referred to in the article which begins this isue. But his attitude would seem to indicate a point of view not so vastly different from the one which that interesting emigre might be expected to take.

Mr. MacDonald means well, and so far as his argument goes, it is sound enough. But he does not seem to perceive the fact that the question of dyes is an exceedingly delicate one just now and that a phrase which would not have been given a passing thought prior to 1914 or 1915 now carries with implications which touch the public some raw places.

There is nothing inherently wrong in telling the dear public that your goods are foreign dyed—unless you want to make foreign dyed goods so common that there will no longer be any distinction in thus labeling them, thereby destroying the very appeal upon which you rely to catch the trade of those who fancy themselves discriminating. There will be no harm in it after the Dye Bill has been passed. And had it not been for the particularly striking tendency of the department stores to play through ignorance—the Cartel's game it might not be so unfortunate even at this time.

But as matters stand it is very bad business. All agree that public support must be won, and that public confidence in American dyes must be strong. This does not mean that the public must be lied to—there has been too much of that already, and it has been a malicious sort of lying—but that it must be made to understand the simple truth! The truth is sufficient to enlist its he

support; most of the trouble has resulted from the real truth having been withheld.

A spirited campaign is now on to preach the gospel, and it is meeting with some success. It must meet with far more success before the victory will be assured, and there is a deeply-rooted popular error to overcome first. The story of the "right dyes wrongly applied" has not yet had time enough to sink in, nor has the relationship between dyes and the national defense had time enough, either. Consequently the public, still regarding a domestic dye industry in the light of a luxury rather than a necessity, travels yet further away from the proper state of mind every time a garment's colors prove fugitive, because it blames the dyes and not the profiteering dyers for the annoyance.

Finally, the campaign of education being conducted among the department store buyers has not been so completely successful that the time has come to abandon it just yet! Any further conversions which can be made are more than timely; they are needed, and we believe that in view of this fact, no effort should be relaxed by the trade journals to keep those behind the campaigns keyed up to a lively pitch of enthusiasm.

Mr. MacDonald uses the pronoun "we" in a manner which implys that he is engaged in the dye producing industry himself. If that is the case he should take an hour off to review the situation afresh. It would seem that he, and not our contemporary, was "unduly sensitive" and that his sensitiveness would better be abandoned in favor of an unyielding callousness to the imagined sufferings of those who are being educated in the A B C of the American dye industry.

This is not the time for abandoning propaganda. We recommend and endorse Dr, Herty's treatment, "Thinking It Through." Instead of advocating retrenchment, rather let us say: "Keep right after 'em; step on it; give 'er the gas!"

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"NOT PREJUDICE, BUT BUSINESS

(*Concluded from page 9.*)

against buying these fine chemicals from the Germans is not founded on any foolish post-war prejudice against trading with a former enemy. It is a matter of international principle, only less grave than the surrender of the High Seas Fleet and the reduction of the German army. To-day it should not be necessary to remind any British citizen that it was Germany's phalanx of expert chemists, with their experienced workmen, which gave her so tremendous an advantage in the early days of the struggle. That military asset was, of course, the direct consequence of the fact that Germany had been chemical maker to the world; nor for several reasons was it possible in those days to compete with the laboratories which in a night were to become munition factories. For one thing, Germany had built up what was practically a monopoly in the fine chemical industry, because the raw materials for that industry are largely the by-products of the dyestuff industry —by that time, of course, almost a German monopoly."

JIGGER DYEING

The following rules for jigger dyeing are useful when soda and Glauber's salt are used:

1. For light shades the liquor should be as dilute as possible.

2. Dyeing is started at 120 deg. Fahr., with the soda and dyestuff alone.

3. After four passages through the dyebath, the Glauber's salt is added, divided for two ends, and two to four passages more are given at about 175 deg. Fahr.

4. Very light tints of direct colors are usually dyed without Glauber's salt, but with soda and 1½ to 3 per cent of Turkey red oil per 10 gallons of bath. The soda is frequently replaced by phosphate of soda (5 oz. for every 10 gallons of dyebath).

5. For medium shades and dark shades the bath is first boiled up with soda, when this does not spoil the colors, to remedy the hardness of the bath, and to facilitate the peneration of the dyestuff solution. One-half of the coloring matter is added in solution and the material is entered. After the first passage, the rest of the color solution is added, and three more passages are given. Finally, the Glauber's salt is added in two portions, and the dyeing is finished off in four to six more passages, with the bath at the simmer.

6. If the desired shade is not obtained, a dilute solution of the requisite dyestuff is added, for which purpose the level dyeing dyestuffs are principally recommended.

7. For dyeing goods which are not easily penetrated, a little more soda is used, and in some cases, particularly for darker colors, 1½ to 3 oz. of Turkey red oil for every 10 gallons of liquor are also added.

8. The repeated and prolonged use of a standing bath can only be recommended for dark shades, and only as long as the liquor has not been made turbid by the dissolved size and other impurities.

9. To replenish the standing bath the following approximate additions are made: one-quarter of soda ash, two-thirds to three-quarters of dyestuff, and one-quarter of Glauber's salt used for the first bath.

10. To control the strength of the salt present in the dye liquor, the hydrometer is employed. The dyebath should stand for dark shades at about 6 or 7 deg. Tw., at a temperature of 60 deg. Fahr.

11. The jigger is the machine most extensively employed for dyeing cotton piece goods; it admits an expeditious and easy working with a small volume of dye liquor.

12. According to the weight of the goods, the dyeing on the jigger requires from three-quarters of an hour to one and a half hours, the goods running at an average speed of about 30 to 60 yards per minute. A quicker movement is not advisable, especially when handling large rolls.

Trials on a large scale with the pad-

ding machine should also be made. This machine is chiefly employed for pale and medium shades. Padding machines with either two or three rollers are employed; those with three rollers give the same effect as those with two, but with fewer passages.

The trough of the padding machine is best made of wood, in machines with two rollers it holds some 12 or 15 gallons, whilst the capacity of a trough of a three-roller machine is nearly 25 gallons. The smallest type of padding machine is, however, quite sufficient for any trials required in a color works. The coloring baths are heated either by an open or by a closed steam pipe, and are prepared for the padding of cotton cloth with direct colors for pale shades with the requisite quantity of coloring matter, 3 oz. of soda ash, and from 5 to 8 oz. of Glauber's salt for every 10 gallons of treating liquid; whilst for medium shades the quantity of soda ash is diminished to 1½ oz., and that of Glauber's salt is increased to 13 or 16 oz. for every 10 gallons of coloring bath.

After half the requisite coloring solution and soda has been added, the bath is heated to about 115 deg. Fahr., and one passage is given. The rest of the color solution is then added with sufficient water to bring the liquid up to its original height for the second passage. The temperature is then raised to about 140 deg. Fahr., and the Glauber's salt is added, divided for two ends, and after two more passages a swatch is taken off for matching. For medium shades the temperature is raised to 175 deg. Fahr.

It may sometimes be necessary to carry out dyeing on the padding machine simultaneously with finishing or sizing, the process being chiefly used for pale shades and for padding cotton prints. In this case the coloring matter, which is dissolved in boiling condensed water, is added to the hot finishing paste, the dyeing and finishing operations being thus combined.

Dyeing in the continuous dyeing machine may sometimes be required when cheap dyeing is to be done.

A simple form of continuous machine is a combination of four compartments, each provided with an upper and lower series of guiding rollers and with squeezing rollers of metal, the uppermost being coated with rubber. Openers are fixed at a suitable distance from these squeezers. The liquor is heated by closed steam coils.

The gray goods run from a small iron truck, are boiled in the first compartment, which is charged with 3½ lb. of soda ash, and freshened up during the passage of the cloth with ½ per cent soda ash on the dry weight of the goods. The bath rapidly turns brown and dirty owing to dissolved size and other impurities, and is, therefore, renewed twice daily.

The three dyeing compartments, with a combined capacity of 650 gallons of liquor, are charged with equal quantities of dye liquor, at first with about 3 lb. of the direct color, dissolved in 10 gallons of water, together with some soda, and replenished during the passage with 5 to 5½ per cent of color on the weight of the goods. The speed of the machine is so regulated that the pieces remain about 3 minutes in the bath.

The goods are run off on to another truck, and are then led to be rinsed on

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another machine. It is advantageous to defer the rinsing of the pieces for a little while, but not for too long, or it is less easy to clean them thoroughly. The dyebaths can be used continuously for a long time, and should be exhausted so far as possible before their renewal, by passing the goods through without adding fresh color.

Matching

The suitability of a new coloring matter for matching purposes is another very important test. The data that may be gathered can be summarized as follows:

1. The new color agrees very well with the matching colors used in the works, and may be substituted with advantage for one of the said colors.

2. The new color, although agreeing very well with the other matching colors used in the works, is different in shade and cannot, therefore, be substituted by itself alone for any of the colors.

3. The new color produces uneven shades with the other matching colors used in the works.

4. The new color is altered in shade by the other colors.

The advantages and disadvantages of after-treatment of a new coloring matter may have sometimes to be investigated. The nature of after-treatment varies, of course, with one class or other of the colors, and can only be decided after it has been definitely proved what dyebath it is best to adopt. Thus direct cotton colors can be improved upon in some instances by chroming, treating with chrome and copper salts, diazotizing, treating with diazotized paranitraniline, with brightening colors, and coupling, and wool colors by afterchroming, tinting, and souring; silk colors by souring.

When a color has proved to be of service the next step is to find out the best way of using it.

In the case of a direct cotton color jigger dyeing should be tried. A small piece of cotton cloth is weighed, and about twice its weight of dyeing color, containing from 8 oz. to 2 lb. of Glauber's salt for every 10 gallons of liquid, in accordance with the shade dyed, and from ½ to 4 per cent of dyestuff, in accordance with the shade which can be dyed to the better advantage as regards fastness to rubbing and brilliance of shade.

With certain bright colors it is advantageous to substitute soap and phosphate of soda for the salt bath, while with others it is of advantage to add soda to the dyebath, generally 3 oz. for every ten gallons of dyebath.—*Dyer & Calico Printer.*

WHAT, AGAIN!

Artificial wool which has been under test at Leeds University is produced from cotton waste, its basis being cellulose acetate, says a press report. It is claimed that the product is an even better insulator against heat and cold than wool, that it takes dyes successfully and that it will wear well. In the experiments made it has been satisfactorily converted into fabrics. Equal parts of artificial wool and natural wool gave a cloth resembling tweed, and the head of the University's textile department has suggested that this should be useful for men or women fancying homespun effects in clothing. Cheapness and possible wearing qualities constitute the special appeal of the material. Its defects are said to include inelasticity and liability to break and these unfit it for yarns of the worsted type, requiring a combing length of two inches or more, though it may serve well for yarn and cloth where short fibers are suitable.

Under the laws of California the Guasti Finch Chemical Company has been incorporated to manufacture chemicals, dyes, etc. The capital of the new concern is $50,000 and headquarters will be in Vernon, Cal. The incorporators are Seconda Guasti, L. S. Finch and J. I. Bariotti, Los Angeles.

TEXTILE ALLIANCE WARNS DYE CONSUMERS TO ACT PROMPTLY OR LOSE REPARATION COLORS

Following is the text of a letter being sent out by the Textile Alliance, Inc., 45 East Seventeenth Street, New York, to dye consumers, notifying them of the availability of certain German Reparation Colors under license from the War Trade Board:

"Gentlemen:—

"For the purpose of assisting you if possible in obtaining your present and future requirements of importable German Reparation dyestuffs we deem it advisable to inform you that there are certain substantial quantities of such dyestuffs now available to American consumers from the so-called 'German Daily Production' stocks but that these quantities will forever be lost to such consumers if orders are not placed with the German manufacturers within prescribed times which are soon to expire.

"In addition to the above stocks which are available we now have ready for delivery at our Hoboken warehouse a large quantity of such German reparation dyestuffs as well as an additional quantity at our Antwerp warehouse which could be promptly shipped to this country.

"If you are to require any German dyestuffs that are permitted to be imported under the regulations prescribed by the War Trade Board Section of the Department of State we would advise you to at once communicate with us so that we may inform you if the required dyes are available or now in our warehouses, and in the event that we can supply them from either of these sources we will furnish you with particulars in regard to price and probable date of delivery."

The Caramel Color Company of America has been incorporated under the laws of New York to deal in drugs and chemicals. Headquarters will be in Brooklyn, and the capital is $5,000. The incorporators include B. Levine, A. Adler and A. S. Fisher.

STRAW AND HEMP DYEING

By L. G. Hayes

Both straw and hemp in properties regarding their affinity towards dyestuffs and bleaching agents they resemble the jute fibers more than any other. Straw generally is from the wheat stalk, being split into the desired width and braided and requires no other preliminary treatment. Hemp has to be retted and beaten out to get the long fibers in the stalk of the plant in a manner similar to that employed in the linen industry. The greatest use of both of these fibers as well as wood chip is, of course, in the making of ladies' and children's millinery and also men's headware, and since the dyeing season for these materials commences soon a few remarks relative to the dyeing of these fibers may be of interest.

Market Forms

Straw comes into the market in hanks about 15 to 20 inches in length and weighing about four ounces. The straw is braided after whatever style the fashions decree; some braids being loosely woven, others tightly woven. The outer surface of straw has a high natural gloss which is due to the hard waxes contained in it, and this is taken advantage of in a number of ways, one being to braid it so that half the braid has the gloss uppermost and the other half is dull, which gives a unique effect when dyed.

Hemp also comes into the market in "pieces," and is braided similar to straw but much more tightly, making it

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B & L Anti-Chlorine
to neutralize chlorine
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Works and Office, Atlantic, Mass.

more difficult to penetrate in the dyeing. A natural wax similar to that of straw is also on hemp, but not to such a great degree. There are two great classes of hemp; namely, Milan hemp, which is the finer quality, and plain or Tayol hemp, the cheaper grade. From the viewpoint of the dyer these two grades are the same, as their dyeing properties are identical in all respects.

Wood chip is only used in the cheaper grades of ladies' hats, but finds its greatest use in the manufacture of children's hats. It generally comes in braids of three-ply, and is so light in color that previous bleaching is unnecessary. Owing to its great brittleness when dry, care must be taken in the handling of this material.

Method of Dyeing

As above stated, all of these goods come into the market in what is known as a "piece" averaging twelve inches in length. These pieces are securely tied at three inches from each end with strings. To assure penetration, these tie-bands must be cut and then replaced by a looser string to help the piece from becoming tangled. Girls are generally employed to run strings through the looped ends of the pieces, and then ten or twelve are tied together with a piece of light wire or heavy cord, which serves as a leader by which the bundle may be removed from the dye-tub.

Most of this dyeing is done in large oblong tubs in which the straw or hemp is packed loosely, and when properly packed every little agitating is necessary; the essential point is to keep the material entirely submerged. The leader strings are fastened to the top of the tub and the goods can be agitated when necessary and removed after dyeing by means of them.

As before stated, these fibers resemble jute in many respects, and in their affinities toward dyestuffs they are practically identical. They all have power to attract basic colors without a mordant and may be dyed with either acid or direct cotton colors as the shade and fastness may require. The general rule, however, is that basic colors are used for brilliant deep shades, acid colors for shades on material difficult to penetrate, direct colors while rarely used on straw are most important for the production on shades on hemp braids.

For the majority of shades bleaching of the material will not be necessary, but when it is, peroxide of hydrogen or sodium should be used according to the regular formula. Chloride of lime should not be used as it has a very powerful action on the natural waxes, destroying them when used to excess.

One of the most important things to be observed in this class of work is that the material should be thoroughly wetted out previous to entering in the dyebath. This natural wax is very difficult to wet and is really water repellent to a certain extent. It is a good plan to anticipate the needs of the following day and boil up the straw the night before and allow it to soak overnight. However, two or three hours is generally sufficient. Soda should be entirely avoided in wetting straw, as it turns the fiber yellow and also makes it very harsh. And this yellow bottom is very undesirable when producing certain shades. It may, however, be used in wetting out hemp if used in moderation. Some authorities recommend a small quantity of bisulphite of soda to soak.

Colors for Straw

As before stated, basic and acid colors are mainly used for this fiber, and the following list of colors which are obtainable to-day will be found sufficient to produce all the seasonable shades.

The well-wetted material should be entered into the lukewarm dyebath in a warm state, as in this condition the natural wax is soft and pliable which greatly aids penetration. The basic colors are dyed with the necessary amount of dyestuff and from 3 to 5 per cent of acetic acid (28 deg. Tw.), depending upon the depth of the shade, and boiled from two to three hours moderately after which they are removed from the dyebath and washed.

The acid colors are handled in the same manner, with the exception that the dyeing is started without any acid and it is added in small amounts. The dyeing operation may take a little longer owing to the slower drawing power of the acid colors.

Blacks

Blacks are produced by a mixture of basic colors in the proper proportions, the colors generally used being Malachite Green, Methyl Violet and Bismarck Brown.

The material should be dried at a moderate temperature. It may be noticed that the basic colors have a light bronziness after drying, but, while objectionable, this is entirely removed in the sizing of hot shellac that the hats receive after they are sewn and before they are shaped in the hydraulic process.

Colors for Hemp and Chip

Hemp and chip are generally dyed with direct colors. The dyebath is made up with the color and the necessary amount of salt and the warm goods entered and boiled from one to three hours, depending upon the amount of color used and also having regard to the penetration. With goods difficult to dye through it is recommended to start the dyeing operation without salt, giving the dye a chance to work through and then adding the salt in small quantities. Basic colors are also used in hemp dyeing where the shade desired cannot be obtained with direct colors. They are dyed exactly as recommended for straw dyeing, and the same colors can be employed.

The Standing Bath

When dyeing black and navy blues it will be found advantageous to maintain a standing bath; that is, to add a smaller quantity of color each successive time in the first three or four batches until approximately one-half of the amount is used. Thereafter continue using one-half the amount, and every fourth batch leave out the salt to prevent precipitation of the color. The following table will explain the method:

	First Per Cent	Second Per Cent	Third Per Cent	Fourth Per Cent
Color	6	5	4½	3¾
Salt	30	20	15	15

Redyes

A large quantity of ladies' hats are dyed over each year, and the dyeing methods are exactly the same as for the new fibers. Naturally the finish of shellac or varnish, as the case may be, must be removed previous to dyeing. With straw hats dyed with either basic or acid colors the cotton threads with which the hats are sewn will not dye, and they will have to be speck dyed in a warm bath with suitable direct colors.—*Colour Trade Journal*

THE DYEING OF ARTIFICIAL SILK

By L. P. Wilson and M. Imison

The dyeing of artificial silk has as a rule, been considered to be practically identical with the dyeing of cotton, but since it has a greater affinity for dyestuffs, and since unevenness in shade is occasionally observed in the dyed material, it was thought desirable to investigate the dyeing of viscose artificial silk from a fresh standpoint.

It has hitherto been assumed that all direct cotton colors are suitable for use with artificial silk as with cotton, but recent research has clearly shown that only a limited number can be consid-

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ered to be eminently suitable from the point of view of giving even effects. The reason for this is that many of these colors are extremely sensitive to those small differences of dyeing affinity which are at present liable to occur in artificial silk, as indeed they do in all textile fibers, but which in the case of short fibers, such as cotton and wool, are concealed by the mixing of a very large number of fibers to form a thread.

Among the sulphur colors also there are many which are very sensitive to variations in the affinity for dyes of the artificial-silk fibers, but fortunately the "even" or less sensitive colors of this class include shades which help to fill in the gaps in the range of "even" direct cotton colors. By the term "even" as applied to dyestuffs in this connection is meant the property of the dyestuff of giving an equal depth of color on artificial-silk fibers of different affinities.

Tannic acid, which is used as a mordant for basic dyestuffs, is taken up by the thread like a dyestuff, and behaves to a certain extent in the objectionable manner of many of the direct cotton and sulphur colors; thus, if there are irregularities in the artificial silk, the basic colors when used with a tannic-acid mordant may give uneven results. Where they are used for topping other dyestuffs the final result is dependent upon the effect obtained with the bottom color.

Sky Blue FF is one of the dyes which is frequently connected with complaints of uneven dyeing, but recent research has shown that if there are some conspicuous offenders in this respect, there are others—*i. e.*, Chrysophenine G, of which no complaint can reasonably be made, since they consistently give even shades when used in orthodox manner.

Methods have been devised which serve to measure the extent to which a dyestuff can exhibit unevenness. A large number of dyes have been tested, and, according to the degree of evenness which they show with fibers of known different affinities, when dyed under standard conditions, have been classified as "even," "moderately even," and "uneven."

(*To be concluded.*)

Dye-a-Grams

The income tax of a bootlegger—yes, yes; go on!—should be classed as a Gin-Come tax.

—o—

"Incorporated Dyestuffs"—*S. R. David & Co. Advt.* We would ask S. R. D.: Incorporated with what?

—o—

Very seldom, according to our observation, is an argument ever settled. It is either postponed or forgotten.

—o—

Food for thought: The cover of The Reporter for March 14 shows at the top an American eagle, and at the bottom of the page the heading: "List of Dyes Licensed by W. T. B. for February Import"! (It may be food, G. E. T., but woefully short rations, we hope.—Ed.)

—o—

The time is coming slowly but surely when the Dye bill will be passed. Sanity cannot be regained instantly. (We feel quarrelsome this week; whaddya mean "regained," anyway?—Ed.)

—o—

Noted among some recent newspaper advertising: "For Sale—A full blooded cow, giving milk, three tons of hay, a lot of chickens and several stoves"!

—o—

"Not a 'Riot of Color,' but the Organization of Color"—*National advt.* Still, it takes organization to stage a successful "riot"!

G. E. T.

Under the laws of Delaware the Amber Dye Works have been incorporated with a capital of $75,000. The incorporators consist of F. A. Hansell, J. Vernon Pimm and E. M. MacFarland, of Philadelphia.

The New York Textile School, according to a recent announcement, is the fortunate recipient of a complete dye laboratory, the gift of H. A. Metz & Co., Inc. Several thousand dollars was expended on equipment alone by the donors, and the "lab" is up to date in every respect.

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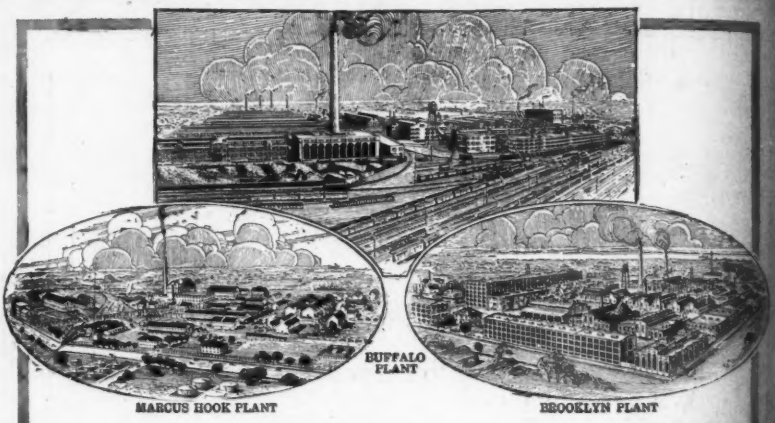

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NATIONAL U.S.A. DYES

AMERICAN DYESTUFF REPORTER

Monthly section devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto

VOL. 8, NO. 14
APRIL 4, 1921

IN 2 SECTIONS
SECTION 2

E. I. duPont de Nemours &
Dyestuffs Sales Departme
Wilmington, Del.

IN THIS SECTION

In the third instalment of his article on "Operations Preliminary to Dyeing Wool Fiber" Professor Louis A. Olney dwells upon the temperature of the bath and the machinery used in wool scouring.

In an article entitled "Garment Cleansing and Spotting" Walter J. Bailey, Jr., gives an outline of the methods followed in a modern cleansing plant, together with specific recipes for the removal of various stains on textile fabrics.

"A Brief Resume of Writing and Printing Inks" is the title of an article by Walter E. Hadley, in which the author touches upon the historical and chemical sides of this subject.

The final instalment of William C. Jackson's treatise on "The Technology of Chrome-Tanned Upper Leather" deals with the coloring and finishing of this product.

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CHINOLINE YELLOW

CHROME BLACKS

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"One hundred ninety-one firms reported a total of 24,736 employees engaged in the manufacture of coal-tar products, 2,605, or 10.5 percent. were chemists or engineers. This is probably a larger proportion of technically trained men than will be found in any other important manufacturing industry in the U. S."—*United States Tariff Commission Report.*

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Contents of This Section

Operations Preliminary to Dyeing Wool Fiber—Part III 11
By Louis A. Olney

Garment Cleansing and Spotting..... 16
By Walter J. Bailey, Jr.

Editorials 21
Food for German Propaganda
Support the A. C. S. Dye Division

A Brief Resume of Writing and Printing Inks 23
By Walter E. Hadley

Technology of Chrome-Tanned Upper Leather—Part IV 26
By William Clark Jackson

Men of Mark in the Dyestuff Field..... 29
Walter S. Williams

Inquiry Department 30

Review of Recent Literature..... 31

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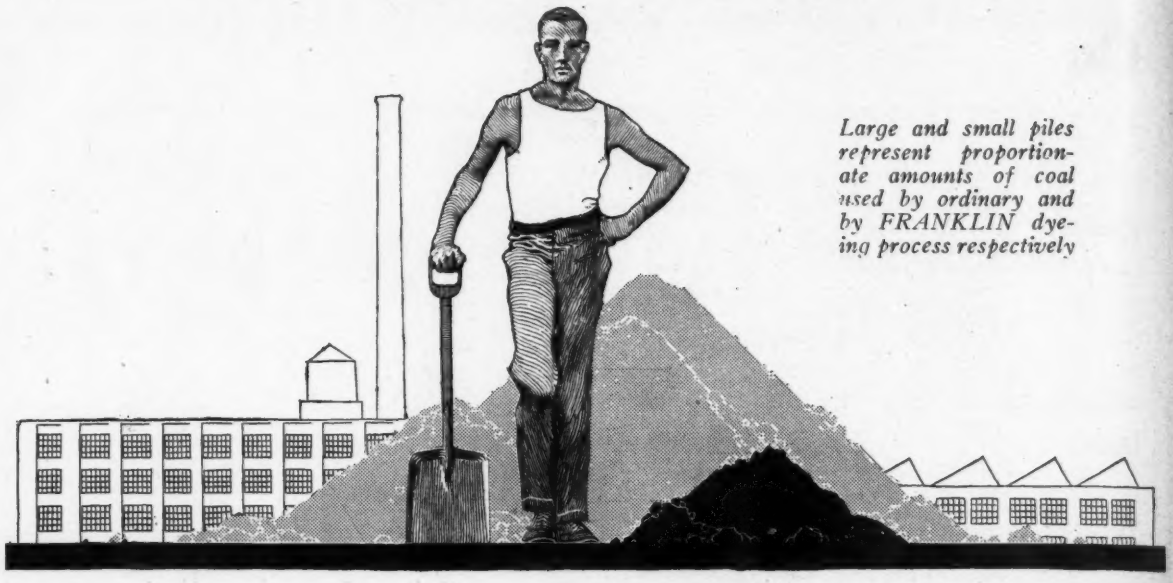

Large and small piles represent proportionate amounts of coal used by ordinary and by FRANKLIN dyeing process respectively

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Franklin Process Machines dye wound packages and Jack-spools in a concentrated bath, the packages being contained in a tightly closed kier, and with only one gallon of liquor to a pound of yarn.

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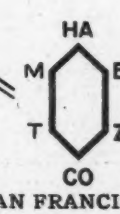

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National Dyes

AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Devoted to the Practical Application of Dyestuffs and the Mechanical Equipment Incidental Thereto

Vol. 8, No. 14 NEW YORK, APRIL 4, 1921 Section 2

Operations Preliminary to Dyeing Wool Fiber Part III—Temperature of Bath and Machinery Used in Wool Scouring

A Discussion of the Conditions Which Control the Temperature of the Wool-Scouring Bath, and a Description of the Modern Types of Wool-Scouring Machinery

By LOUIS A. OLNEY

A COLD scouring bath has very little solvent and emulsifying action upon the accompanying substances of wool, but as the temperature of the bath is raised the solvent and emulsifying action increases and, from a theoretical point of view, would become the greatest at a boiling temperature.

Influence of Temperature on the Action of Scouring Agents

In wool scouring, however, another element enters into consideration; namely, the action upon the wool of the scouring agents other than water that are in the scouring bath. At a low temperature these reagents have but slight deteriorating action upon wool, but as the temperature rises this action increases, and at a boiling temperature the combined action of soap and alkali is energetic enough to seriously tender the wool.

A temperature must therefore be used in wool scouring that will be sufficiently high to give the scouring solution an energetic solvent and emulsifying action, but at the same time sufficiently low to prevent the soap and alkali from seriously injuring the wool.

Experience shows that temperatures of 110 to 130 deg. Fahr., depending upon the character of the wool and the scouring agents, are best. Above 130 deg. Fahr. there is not only danger of felting the wool and of detracting from its luster and feel, but of seriously reducing its strength. Temperatures below 110 deg. Fahr. are not sufficiently high to soften and properly emulsify the wool grease, or rapidly dissolve the suint. In most cases the temperature is not allowed to go much above 120 deg. Fahr.

The temperatures mentioned above have been established through observations, by wool scourers, of the results obtained upon different types of wool and with different scouring agents, but the accompanying "graph" (see Fig. 1) gives an insight into the reason why these temperatures have proved to be the best.

"Factor of Safety" in Textile Material

In reality a "factor of safety," so far as tensile strength is concerned, is involved in the manufacture of textile material. Bleached cotton cloth, for instance, frequently diminishes decidedly in tensile strength as compared with the gray cloth, and frequently scouring, dyeing and finishing processes, for one reason or another, impair the strength of both cotton and wool fabrics. In general it has been considered that a fabric likely to become tendered should have sufficient initial strength to permit its losing a maximum of 20 per cent of its original tensile strength without seriously impairing its commercial value. A loss of 10 per cent in tensile strength should not seriously injure any well-made fabric.

Applying these limits of 10 and 20 per cent loss in strength to wool fiber, we find from actual experiment that it works out somewhat as is shown on the following "graph," where the solid line represents the tensile strength of the wool fiber and the dotted line the relative solvent and emulsifying action of the scouring liquor. The percentages at the bottom represent total tensile strength of the fiber, while the figures at the right represent the temperature of the scouring liquor.

An observation of the continuous line curve, which represents loss of tensile strength, will show that between 110 and 130 deg. there is a loss of from 7 to 20 per cent. An observation of the broken line curve, which represents the efficiency of the scouring bath as to solvent and emulsifying action, will show that it

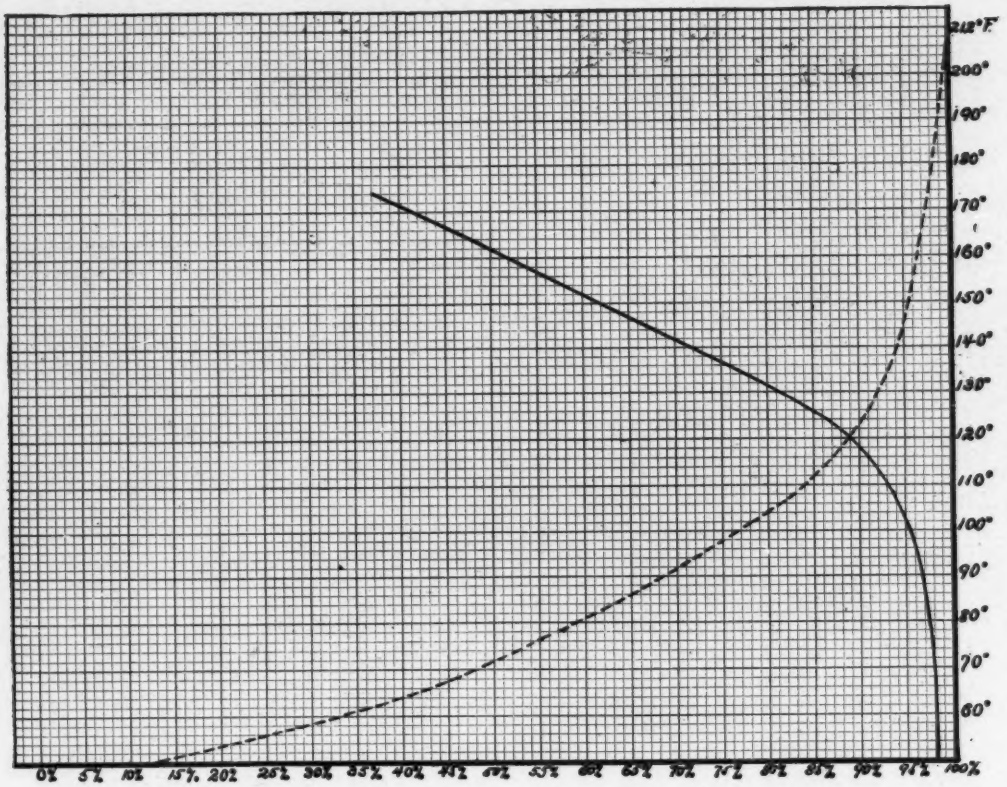


FIG. 1
Graph Showing Relation of Temperature of Wool Scouring Bath to Loss of Tensile Strength of Wool

FIG. 2
Installation of Three Bowl Wool Scouring Machine at Stirling Mills, Lowell, Mass.— C. G. Sargent's Sons Corp.

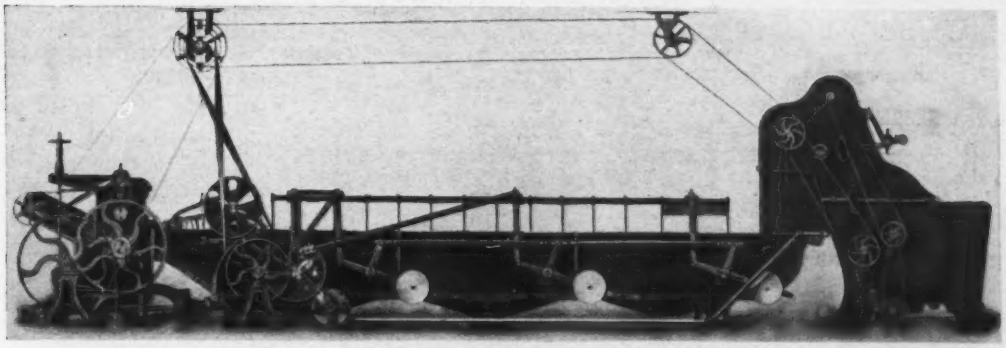


FIG. 3—*Scouring Machine of the Rake Type— C. G. Sargent's Sons Corp.*

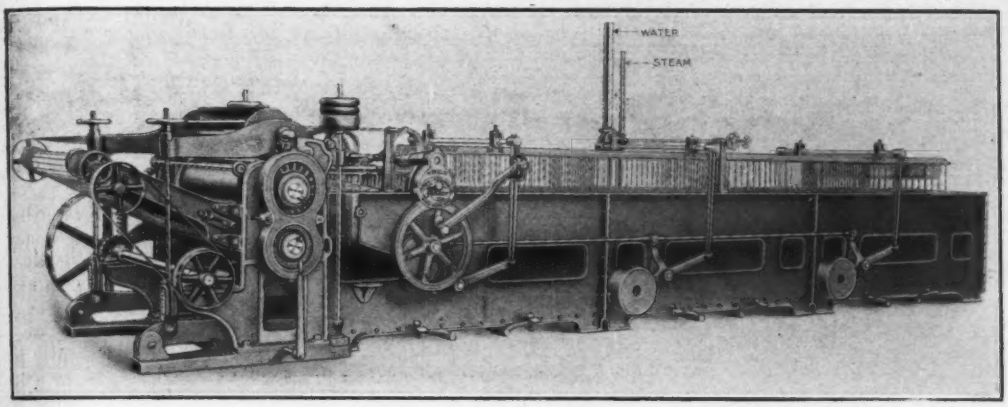


FIG. 4—*Scouring Machine of Rake Type—James Hunter Machine Company*

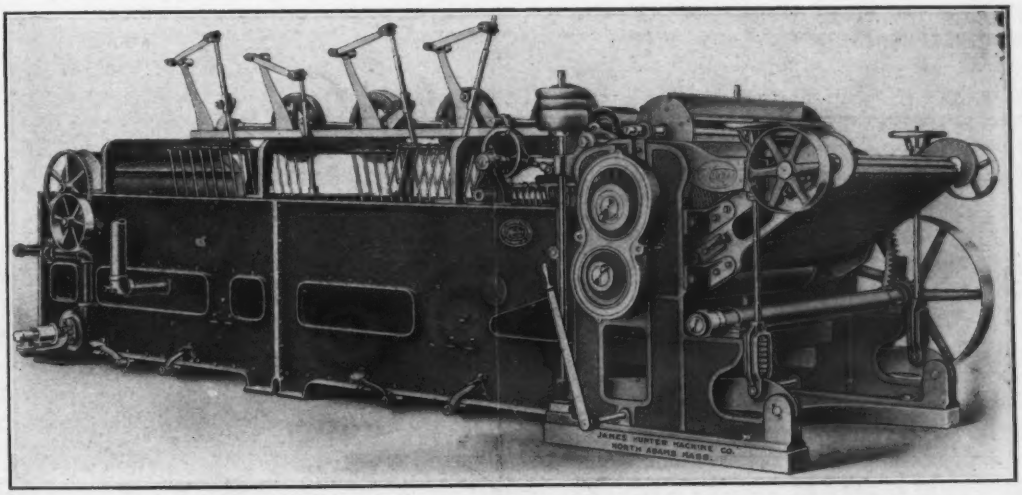


FIG. 5—*Scouring Machine of Fork Type—James Hunter Machine Company*

crosses the other curve at a point representing approximately 120 deg. Fahr. and 11 per cent loss of tensile strength, this temperature being the one established by wool scourers as being best with the majority of wools.[10]

[10] The data used in plotting the above curves is believed to be approximately correct, although not established by actual results obtained throughtout their entire length. Any such curves must represent approximations, for they would vary considerably both with the grade of wool and the nature and concentration of the scouring liquor used. Considerable work has already been done at the Lowell Textile School along these lines, and it is hoped that additional work now contemplated will establish these curves with greater accuracy.

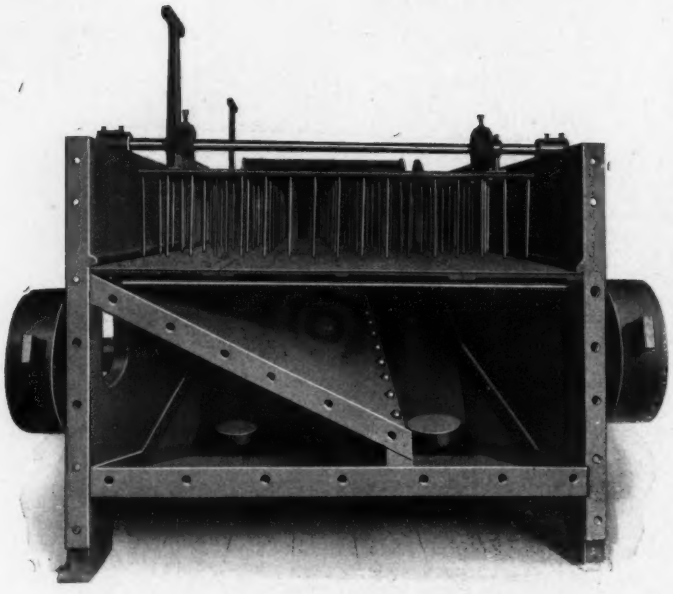


FIG. 6—*Cross-Section of Scouring Bowl Shown in Fig. 4*

From the foregoing discussion it will be understood that the wool scourer has two very important elements of control over the condition of the scoured wool—first, the nature and concentration of the scouring liquor, and, second, its temperature.

MACHINERY USED

Although the use of proper scouring agents and due regard to the temperature of the scouring bath are the paramount considerations in successful wool scouring, the apparatus used and its installation are largely the controlling factors of the economy of the process, and to no little extent, of the condition in which the wool is left after the process is completed.

SCOURING MACHINERY OF EARLIER DAYS

In the earlier days of the industry wooden tubs heated with live steam or steam coils were extensively used, in which the wool was worked by hand by means of wooden poles. The scouring bath was made up with the proper quantities of soap and alkali and the temperature brought to the desired point and the wool then introduced and worked until the necessary scouring action had taken place. The tub was frequently provided with a large gate which could be easily opened, and the liquor quickly run out, the wool being retained in the tub by a rather coarse screen. Sometimes fresh water was run in for several minutes as the waste liquor was running out, thus cooling the bath slowly, while in other cases the scouring liquor was allowed to immediately and entirely drain off, and the wool then rinsed with warm fresh water, and finally with cold water.

Various types of so-called "rinse boxes" in which a cage containing the wool was lowered in and out of the scouring and rinsing liquor were also used. As time went on these hand methods were for the most part replaced by machines and to-day practically every establishment of any size uses one of the several types of continuous scouring machines.

MODERN SCOURING MACHINERY

In the modern machines the scouring and rinsing liquors are contained in long rectangular iron tanks commonly known as "bowls," and through these the wool is slowly worked by means of large "rakes" or "harrows" in some instances and by means of "forks" in others. As a rule not less than three and frequently four or even five such bowls are arranged in a tandem position, and so equipped with travelling aprons, squeeze rolls and auxiliary rakes, as to automatically carry the wool through the entire number. In this manner it is possible to feed wool in the grease at one end and deliver thoroughly scoured wool at the other. In Fig. 8 there is shown a set of three such scouring bowls in actual

FIG. 7—*Feed End of Bowl, Showing Rotary Pump and Ducker*

operation. Such a set is approximately 90 feet long, 4 feet wide and will scour from 1,000 to 1,500 pounds of wool per hour, depending upon the character of the wool. A detailed view of the first bowl of the series equipped with an automatic feed is shown in Fig. 3. This machine is of the "rake" or "harrow" type, and the driving mechanism slowly and rather gently carries the wool along as it floats in the scouring liquor just above a perforated bottom located about one-third of the distance between the top and the bottom of the bowl. The bowls are built with good depth in order that a comparatively large volume of scouring liquor may be introduced, and also to provide compartments where the heavier dirt may settle out.

Another type of "rake" machine is illustrated in Fig. 4, and a "fork" machine in Fig. 5. A cross-section of the scouring bowl represented in Fig. 4 is shown in Fig. 6, the rake being seen in the washing trough just above the perforated copper bottom. The liquor which comes from the squeeze rolls passes into a settling tank of three sections which is located just beneath the main compartment of the bowl. A cross-section of one of these settling tank compartments is shown in the lower left-hand corner of Fig. 6. A centrifugal pump connected directly with the end of the settling tank pumps the clear liquor back into the upper end of the bowl where it is used over again. In Fig. 7, which illustrates the feed end of a bowl, there will be seen such a pump and its accompanying system of piping, also the "rotary ducker" which serves to immediately submerge the wool in the scouring liquor as it enters the bowl. In Fig. 3 there is illustrated an entirely different type of "ducker." It consists of two copper boxes with perforated bottoms which are attached to the rake in such a way as to push the wool down into the scouring liquor just as it enters the bowl. The wool remains submerged throughout the entire length of the machine and the rakes are so constructed and driven as to agitate the wool as little as possible and yet keep it moving in the proper direction. Upon arriving at the delivery end of the bowl, which is shown in Fig. 8, it is flushed along by means of an auxiliary rake, which carries it to the squeeze rolls illustrated in Fig. 9. After passing through the squeeze rolls a traveling apron carries the wool to the next bowl, or deposits it elsewhere if it is at the end of the series. In the series represented in Fig. 2, the wool delivered from the third bowl is dropped upon another conveyor which automatically carries it to the dryer. It is thus possible to have the whole process automatic from the entrance

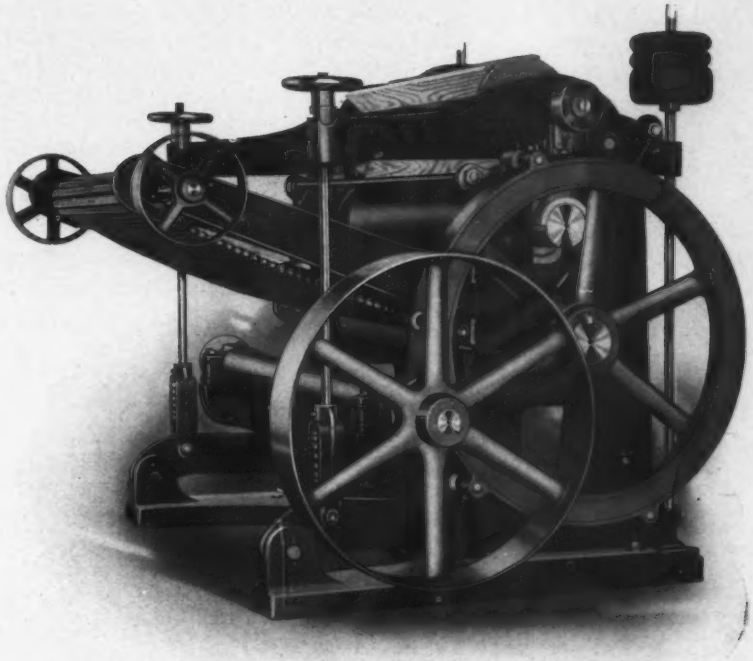


FIG. 9.—*Delivery End of Bowl, Showing Squeeze Rolls and Traveling Apron*

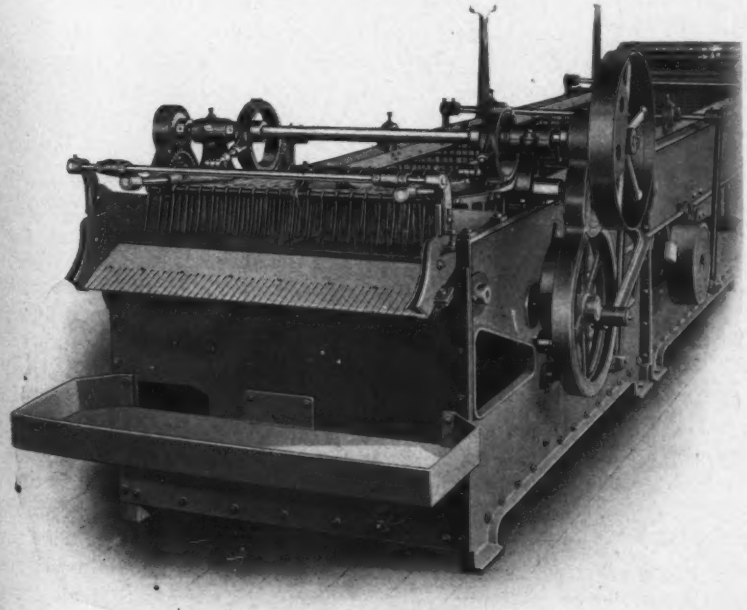


FIG. 8—*Delivery End of Bowl, Showing Auxiliary Rake —James Hunter Machine Company*

of the wool into the scouring machine to its delivery in a scoured and dried condition from the dryer. Where a blower system is installed it is possible to make the process even more automatic by bringing the wool from the storehouse to scouring machine and blowing it from the dryer to the picker room without handling.

(*To be continued.*)

Garment Cleansing and Spotting

An Outline of the Methods Followed in a Modern Cleansing Plant, Together with Specific Recipes for the Removal of Various Stains on Textile Fabrics

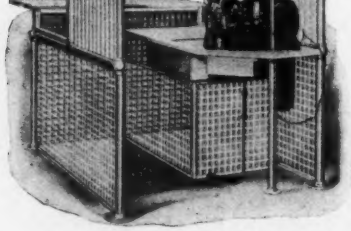
By WALTER J. BAILEY, JR.
Bayburn Cleansing Shop, Cambridge, Mass.

GARMENT cleansing is divided into nine operations, as follows: Marking, sorting, dry cleansing, steam cleansing, dyeing, spotting, assorting, pressing, and shipping. A general description of the several operations will be interesting but the spotting, which consists of removing stains from fabrics, may be found useful as well as interesting.

Marking, Tagging and Pricing

Marking and tagging is a very important operation, as it is here that the garments are started on their trip through the cleansing plant either right or wrong—the latter causing much delay, dissatisfaction and expense. The marking has to be done by a girl of much experience having a general idea of the process and a great deal of common sense. It is done either by hand with pen and ink or by a marking machine, which is faster.

It consists in placing a numbered identification mark on the garment by means of a tag, which is either sewed or placed on by small points through the belt or under the arm of the garment, whichever the marker finds best from the standpoint of not injuring the garment itself. These numbers are used later, and therefore must be made clearly legible with an ink which will not come off in any of the operations to which they must be subjected. This same girl must be proficient in pricing the articles so that neither the customer nor the concern will be wronged. The next step after marking is sorting and separating the different classes of garments; first, for steam cleansing, and, second, for dry cleansing.



Marking and Tagging Booth
Showing the marking machine. The garments are received from the back, each order taken separately. The proper identification is placed on the garment here.

Steam Cleansing

There are many articles which come to the cleansing plant to be dry cleansed, such as articles of bedding, blankets, cotton-covered comforters, fancy embroidered table covers, lace curtains, rubber raincoats, etc., which it is impossible to cleanse except with the soap-and-water process known as steam cleansing. It is often a hard task to convince a customer that these articles cannot be dry cleansed as they have ordered. The general public is allowed to continue to entertain an entirely wrong impression, and believes its twenty-five-dollar blankets are cleansed by the so-called dry cleansing process. There are exceptions in the case of blankets, but these are very few, and in this article it will be sufficient to give the generally common procedure.

Steam cleansing from the standpoint of the cleanser is more than washing as thought of by the public when they hire a woman to come in on Monday and do the family washing. It is a careful study of fabrics in combinations to remove stains and soil which cannot be removed by any other means. It is a study of how to save the colors from bleeding where there is more than one in the garments. If the manufacturer would only consider this statement when he manufactures two or more colored silk for wearing apparel he would do more to help the public, and incidentally the cleanser, out of many arguments and sometimes trouble. It would be a pleasure to think that all dress goods colors were fast to soap and water and would

be set by means of an acid bath. Steam cleansing is a study of mild bleaching in some cases and severe bleaching in others, as in the case of white flannels and white silk. Lastly, it is a study of finishing the process by sizing, and bluing in the case of white goods, brightening and dulling effects of soaps on colors, so that the articles may be carefully pressed and returned to the customer looking as lustrous and feeling as firm as any article which has been nicely dry cleansed.

Articles to be dry cleansed are separated into six different lots, as follows: White silk goods, white woolen, dark silk, gray woolens, ladies' dark blue and black woolens, serges, and men's dark colored garments. This necessitates making six different piles, which is very easily done by a special rack having six different compartments. The person doing the sorting will, of course, give very careful attention to the condition of the garments and texture of the fabrics, but in the six classes for naphtha or dry cleansing search must be made through the pockets and linings for common matches. Matches are trouble-makers in the naphtha room and oftentimes result in a fire, with a great loss of property, and sometimes even the operators barely escape with their lives.

Dry Cleansing

The so-called dry cleansing process is also known as naphtha cleansing. It is a process of washing garments with gasoline or any dry liquid. Gasoline is the most generally used, as it is less expensive even at the present high price. It is fairly stable at ordinary temperatures, but still will evaporate at a temperature of over 125 deg. Fahr. with great rapidity. The six lots are all washed in naphtha but by different methods; for example, a very thin georgette evening gown trimmed with heavy beads must be handled alone and done practically all by hand, while a man's heavy overcoat is put in the naphtha with twenty-five or thirty other articles of similar weight. The same style washing machine is used as that of the laundry, with exception that it is advisable to have a metal shell and rotate the cylinder very much slower.

Soap in Dry Cleansing

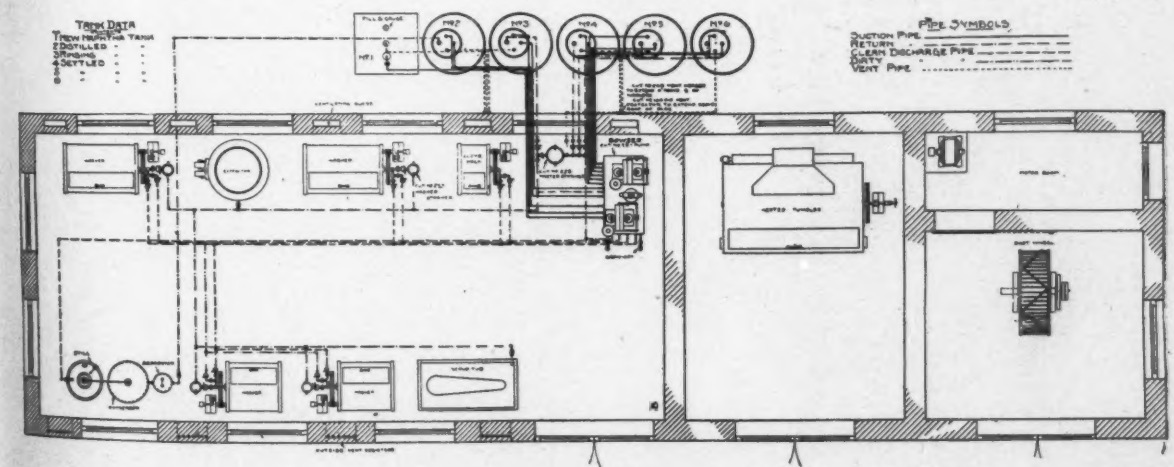
Soap is as important a factor in dry cleansing as in the family wash. There are many dry cleansing soaps on the market, but some find they obtain better results from a soap made new at the plant as they need it, with a fatty acid saponified with ammonia. This gives a very strong odor of ammonia uncomfortable for the operator, but the cleansing power is unexcelled. This soap must be freely soluble in cold naphtha, because a soap that settles on the bottom of the machine is doing nothing to aid in the cleansing and is only wasted and drawn off to be separated in the clarifying process.

Rinsing

The garments, having been properly washed, must now be rinsed with clear naphtha. The white silk or woolen must have at least two perfectly clean rinses, whereas the men's dark suit lot is satisfactory with but one. This operation being complete, the garments are dried in a drying tumbler or in a hot room to remove the last trace of naphtha, even to the odor.

Drying

The drying tumbler is a machine having action similar to the washing machine, but is so conducted that a draft of hot air is blown through the garments, exhausting out of doors. Light silks and white woolens are more satisfactorily dried by hanging with temperature in a hot room, so that there is no more friction subjected to a delicate material, thus giving further chance for injury. After drying comes the process known as spotting.



Floor Plan of a Naphtha Cleaning Plant

Showing the lay-out of the washing machines, extractor, still, pump, underground tanks for storage of gasoline, drying tumbler, motor and dust wheel

Spotting

After a garment has been cleaned in naphtha it should be freed from grease and oil. In removing the oil the dirt and the dust are also removed, if the naphtha cleansing process has been efficiently done. There are other stains and substances which are often found on the fronts of coats and vests that are insoluble in naphtha—paint spots, which are found anywhere on the garments, and a hundred other spots which are not soluble in gasoline or naphtha and must be dissolved by some other medium, such as alcohol, tetrachloride of ethane, tetrachloride of carbon, ether, chloroform, acetone, etc. There are still other spots which have no trace of substance but have stained the fabrics, and must be treated sometimes with an acid. alkali, peroxide of hydrogen, potassium permanganate, sodium bisulphate, etc. To go into details more specifically, we will consider the common stains in the following order: Varnish stains, paint stains, color stains (dye), acid stains, alkali stains, coffee stains, blood stains, fruit stains, perfume stains, medicine stains, perspiration stains, rust stains, wine stains.

Varnish Stains

Varnish stains are oftentimes troublesome, especially on silk, as this fabric will not stand much rubbing. Varnish also leaves a color stain in some cases after the substance is removed. First treat a varnish stain with tetrachloride of ethane and scratch gently with finger-nail. After the substance has been removed, if color stain results, treat with alcohol; hot alcohol is more efficient where the color of the fabrics will stand it.

Paint Stains

Paint is much easier to remove than varnish; it does not leave a stain which has to be removed afterwards. In many cases of paint a mixture of tetrachloride of carbon and tetrachlorethane is used, with the aid of a piece of castile soap. Rub the dry piece of soap on the stain, then wet with tetrachloride mixture. In many cases of extreme hardness of the stain let it soak for a short time, as in time the paint will soften enough to work. The finger-nail or horn spatula is excellent to work the stain, and the paint will come off very easily. After the removal of the paint the garment should be brushed and naphtha used around the spot to remove the tetrachlorides. On men's dark wear it is economical to remove the paint in the naphtha room with a strong solution of naphtha soap made up in a medium of kerosene and applied in the same manner as the tetrachloride method.

Dry Cleansing Washer
Showing the metal shell and wooden basket best suited for general all-round naphtha cleaning

De Laval Centrifugal Benzine Clarifier
This machine revolves at 7,200 r.p.m., working on the principle of a cream separator. It has a particular advantage of washing the dirty black gasoline with water. The water and dirt run out of the lower spout. Clear gasoline from the next spout up. The top spout is an overflow, and only shows when the machine is filled with dirt, and must be cleaned.

Color or Dye Stains

Color stains appear on garments mostly under the arms of ladies' jackets or on skirts, especially on the white lining. Oftentimes this is from a logwood-dyed interlining, or may be any color from a waist, run by perspiration.

On the white lining it is well to rip open the seams so that the material may be pulled away from the rest of the garment, then the following procedure is started: First, take out all the color possible with a hot solution of neutral soap, dipping the stained portion in and out until all of the loose color is removed. If this does not take out the stain satisfactorily, hot alcohol is next used in the same manner as the soap solution. After both the above methods have failed,

we next resort to a strong reducing agent known in this line of work as zinc bleach. This is made up of zinc dust and bisulphite of soda; boil, settle, draw off clear liquid, boil this clear liquid, and use hot in the same manner as the soap. It is very seldom this last resort is necessary.

Acid Stains

Acid stains show up mostly on men's blue, brown and black clothes, and show a bright orange, yellow or red stain. Concentrated ammonia is most effective and is put on in full strength and allowed to remain there to dry.

Alkali Stains

Alkali stains are treated with acetic acid, which is sponged on and dried. In some cases dilute sulphuric acid is better, but must be followed by careful rinsing.

Coffee, Tea and Cocoa Stains

Coffee, tea and cocoa stains invariably contain some grease from the cream, and in many cases a slight amount of albumen. The grease must be removed first by naphtha or carbon tetrachloride. The stains are then sponged with lukewarm water, using a little soap if necessary to remove the albumen. In the case of cocoa this usually is sufficient, but tea and coffee have a yellow stain which is easily removed by bleaching with potassium permanganate, decolorizing the permanganate stain with sodium bisulphite solution. Rinsing must follow, leaving no trace of the chemicals in the fabrics.

Blood Stains

Blood stains must be kept away from all heat until the stain has been entirely removed. It is much easier to remove this class of stains if they are fresh, for even when drying at ordinary temperature some of the substance is rendered almost insoluble in cold or lukewarm solvents. Garments with these stains should not go through the naphtha until the stain has been eliminated. First, treat with cold water, giving time enough to dissolve the albumen and other substance. Light rubbing is efficient, but must be done with much care in silks. Ammonia and soap may be used lukewarm, and in ordinary cases the stain is dissolved but sometimes leaves a slight trace of yellow on white goods. This may be bleached with permanganate of potash, followed by sodium bisulphite, with the aid of oxalic acid. Thorough rinsing must follow, and then, if free from stain, dry and proceed with the cleansing as on any article.

Fruit Stains

Fruit stains in many cases are weak acid stains having a residue of sugar or even orange matter. Weak ammonia aids in removing any trace of acid, and leaves the stain in good condition for sponging with soap and water. In many cases this is all that is needed to remove the stains, but when a yellow stain is left peroxide of hydrogen will oftentimes eliminate that which remains.

Perfume Stains

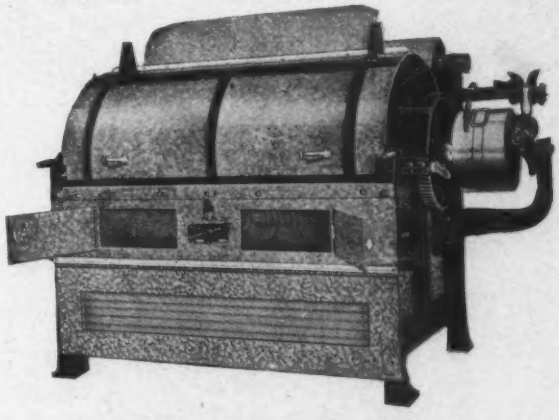
Perfumery stains are very obstinate in their removal. There is a combination of essential oils and alcohol which often affects the color of the material on which it is used. In this case there is little to be done after dissolving any oil that may be present with ether and then sponging with alcohol to pick up any ring of settled color which may be present. Sponging with soap and water oftentimes helps, but invariably a dirty yellow stain is left; peroxide of hydrogen or potassium permanganate and sodium bisulphite are all that is left to help out of this difficulty.

Medicine

Medicine stains are always of unknown nature, and as a rule can only be detected by the sense of smell. Warm water, with a neutral soap, is the first and most simple of all procedures. Stains that do not respond in this way are then subjected to alcohol, ether, chloroform, etc., seeking a solvent for the substance. After the substance has been dissolved we resort to oxalic acid and bleaches to remove the remaining stain. In extreme cases of obstinate spots we resort to the dangerous reagent of cyanide of potassium. This, however, is very seldom done on account of the poisonous character of this reagent.

Perspiration

Perspiration is a disastrous element on garments, especially silks. It affects nearly all colors, whether on cotton, wool or silk. When the color has been



Heated Drying Tumbler

Showing the steam pipes at the bottom, where the air is drawn in and blown hot through the garments to remove the odor of gasoline.

stripped there is little to be done if acetic or dilute sulphuric acid will not restore it. White silk turns yellow, and all silks decay under the influence of perspiration. First sponge with warm water to remove any salt that may be present. Permanganate of potash is the best bleach for these stains, decolorizing the permanganate stains with bisulphite of soda and oxalic acid. Always remember to rinse well after these reagents.

Rust and Metal Stains

Rust stain is a very common stain on garments, especially the light summer dresses. This is easily removed by hydrochloric acid and rinsed out with warm water. There is a compound with a trade name Erusticator which comes in convenient form in tubes. This also must be rinsed carefully from the fabric.

Scorch and Burns

A slight scorch, which shows yellow on white, may be helped by sponging with peroxide of hydrogen and putting in the direct sunlight for some time. If the first application is not sufficient, apply again. Colored goods may be sponged with water and put in the sun, taking care not to leave in the sun long enough to fade.

In general we have covered the most common stains which are found on garments and household goods. These stains here discussed give a general idea of the procedure taken even on unknown spots. The spotter may guess that a stain is a certain thing, but with few exceptions it is merely a guess until he starts to dissolve or bleach.

Sorting

After the spotting has been completed the complete orders are brought together by means of the marks previously affixed to the garments. This makes every order complete before it leaves the spotting departments going to the press-room.

Pressing is done by men and women on their respective garments, aided by steam pressing machines and electric irons. The garments are then hung in a dry room for at least one hour to remove all trace of moisture before folding and packing. They are then delivered to the customer ready to wear, with the freshness of a new garment.

A Brief Resume of Writing and Printing Inks

Historical Review of Writing Inks—The Modern Tannin-Iron Inks—Their Chemical Nature and Process of Manufacture—Methods of Obtaining Permanency—Added Coloring Matters—Bleaching and Restoration of Writing Inks—Logwood Inks—Black and Colored Printing Inks

By WALTER E. HADLEY

WHEN it is considered that ink is universally used, wherever and whenever any records are to be preserved, it is amazing that apparently so little thought is given to the quality of the ink, and the permanency of the writings to be produced therewith.

Having occasion recently to visit the office of an ink factory, my attention was attracted to a lettered sign which had, apparently, at some time, been exhibited with the object of advertising the brilliancy and permanency of that particular brand of ink. Unfortunately, the outlines had grown exceedingly dim, and in some sections were practically obliterated, so that the sign, instead of convincing one that the ink in question was worthy of confidence, served only to emphasize the fact that the ink, lacking permanency, was practically worthless.

It is interesting to view degrees, diplomas and certificates hung on the office walls of doctors, dentists, etc., and it is really remarkable when one stops to consider the fact that very few of the signatures have been able to withstand the effect of even the few years which have intervened since they were written. Furthermore, it will be readily noted, that where several signatures have been recorded, practically no two show the same degree of permanency.

Deplorable as the aforementioned instances are, they but serve to accentuate the fact that we are lamentably negligent as to the quality of our writing fluids.

Probably the majority of people who use ink are perfectly satisfied if the ink flows freely and smoothly from the pen, and do not for a moment consider the lasting qualities of the ink.

There are many formulae, derived from different sources, for the preparation of various types of ink, special claims being advanced as to the advantages accruing from their use.

It is not the object of this paper to give formulae for the manufacture of any particular inks, such data being well provided for in such current books as Lehner's "Ink Manufacture" and Mitchell's "Inks."

The object in preparing this brief paper on ink is to awaken in the mind of the laymen more of an interest in regard to a subject of which too little is known and in regard to which too much is taken for granted.

Ink Considered Historically

Ink, considered from a historical standpoint, is extremely interesting, samples of Egyptian writing, which

are still plainly legible, having been produced as early as 2500 B. C., while it is generally conceded that other specimens of papyri date back to at least 3500 B. C.

The ink used by the earliest writers undoubtedly consisted of a carbon base prepared either by burning wood or animal matter, after which same was ground to a fine powder and properly combined with oils and gums, and probably oftentimes thinned with water to the proper consistency for writing.

"India ink" was invented by the Chinese about 1200 B. C. and was prepared by mixing a very fine soot with a gelatine prepared from asses' skin.

The greater number of documents which have come down to us from the medieval times were written with "India ink." Owing to the permanent character of writings made with "India ink" there is still a very strong tendency to use this type of ink in many modern documents. While "India ink" has no tendency to disintegrate with time, it can be obliterated if treated with water.

Tannin-iron inks were introduced into Europe from Arabia during the early part of the twelfth century.

Writing Materials

Papyrus, vellum and parchment were the earliest forms of material upon which ink writing was practised.

Papyrus was largely used by the early Egyptians and many perfectly preserved specimens have been found in the pyramids of the Pharaohs. Papyrus was prepared from a form of reed which grew luxuriantly on the banks of the Nile.

Vellum was prepared by the proper treatment of the skin of calves, while parchment was prepared from the skin of the sheep.

The materials used for applying the ink to the paper consisted at first of reeds and brushes, and later the stylus pen. During the sixth century the quill pen came into existence and its use was continued for centuries.

Steel pens first came into regular use in 1803, and ever since that time the makers of the steel pen have been endeavoring to duplicate the desirable qualities of the quill pen.

Tannin-Iron Inks

The tannin-iron inks are now conceded to be the best and most permanent inks which can be produced, but care is necessary in the compounding of same, otherwise inks produced with these ingredients may entirely disappear from the paper.

Formerly the tanno-gallate of iron inks were prepared by treating the galls with boiling water, but it is now considered that a far better extract is obtained by allowing the extraction to take place in the cold.

The compound containing the tannin is allowed to ferment for about two weeks, when a mixture of gallic and tannic acids will exist in the solution.

In tannin-iron inks there is always more or less of the gallic and tannic acids combined with the iron in the insoluble ferric condition, and this is the portion of the ink which imparts the immediate color and which requires the presence of gum to hold same in suspension. The gallic and tannic acids, in combination with iron in the ferrous condition, are soluble and do not require any gum. The first mentioned condition, where the compound is in the ferric state and fully oxidized, does not penetrate the paper and therefore is not permanent. The second condition, that of the compound in the ferrous state, allows the soluble ink substance to penetrate the paper, and thereafter, upon oxidation, is permanently fixed upon and within the paper.

Chinese galls are not as suitable for ink making as are the Aleppo galls, inasmuch as the latter contain a ferment which readily transforms a portion of the tannin in gallic acid. In making use of Chinese galls, it is necessary to introduce a ferment, oftentimes in the form of yeast.

Ferrous sulphate, or copperas, $FeSO_4$, as clear green crystals, represents the best iron salt for the preparation of the tanno-gallate of iron inks. The use of this substance allows the iron to exist in the ink in the form of ferrous salts, and upon application to the paper they oxidize to the ferric condition and produce a permanent black.

Inks when first applied are in the liquid condition. If the ink used is a gall-iron composition, a chemical change very soon begins to take place whereby a darkening of the ink is noted and within a few days a deep black color will have been attained, assuming that the ink was properly prepared. This darkening is principally due to the absorption of oxygen from the air. Other conditions bring about the changes occurring in the ink, after its application to paper, the composition and purity of the paper, as well as the gums, acids and added color, all exerting more or less influence.

Gall-tannate of iron inks are prone to settle out from solution, and it is customary to add a gum in order to hold the particles in suspension, a vegetable gum known as acacia being largely employed. In addition to holding the particles in suspension, the gum thickens the ink, thus causing it to flow more evenly and smoothly, and further the gum serves to cover the ink, after application to the paper, and arrests any later tendency for an undue absorption of oxygen.

It has been observed that old writings, which still continue to possess a deep black color, and are glossy in appearance, do not respond to tests for gums of vegetable origin. Invariably such writings are found to owe their permanent character and brilliancy to the presence of isinglass, which was used as a medium for holding the ink particles in suspension, the coating furnished by the isinglass having protected the ink substance from over-oxidation.

Action of Free Acid in Ink

The addition of free sulphuric acid to any ink has for its object the holding of the iron salt, in solution, in the ferrous condition. It increases the limpidity, and causes

(*Continued on page* 24.)

AMERICAN
DYESTUFF REPORTER

In Two Sections—Section Two

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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FOOD FOR GERMAN PROPAGANDA

IT has been established beyond the possibility of successful contradiction that the one means capable of furnishing adequate protection for the American dye industry and preserving it intact as one of the hard-won fruits of an expensive and deadly war, is the licensing system proposed in the present Dye bill, which may be observed in full operation in England for the next decade. It is unnecessary to rehearse all its good points here, but the time has come for another reminder to those who are still a trifle shaky in their opinions on this all-important subject, to the effect that the proposed law is designed quite as much for the protection of dye consumers as it is for safeguarding the interests of the dye makers. Too often is this fact lost sight of by those who are prone to jump hastily to conclusions without a full knowledge of the projected statute and its workings.

The Dye bill is based on the premise that the textile and other dye-consuming industries, and the dye-making industry, must work hand-in-hand; that the interests of one are, in the long run, identical with the interests of the other. It was designed with a full understanding of the fact that disgruntled dye users, hampered in their plans for capturing their share of world trade, could in time bring the dye manufacturers to almost as certain ruin as could the competitive methods of an unrestricted Cartel. Its fundamental purpose is not solely the exclusion of foreign dyes, as some will say whenever the chance presents itself, but instead to aid at all times in maintaining a steady supply of whatever dyes American consumers may need, no matter whence they must be brought, while the building of the American industry continues, automatically shutting off the importation of certain colors only when these become available here in such form as to satisfy the consumer in every respect. The virtues of the measure are positive, not merely negative.

It is important to keep this fact constantly in mind whenever discussions of the Dye bill arise.

During the past year much blame has been laid at the door of the American dyer for his undeniable tendency to profiteer by using wholly improper colors for the class of work on hand in place of the proper colors readily obtainable from American manufacturers—and then shifting the responsibility for the resulting fiasco to the shoulders of the American dye manufacturers! This sort of thing has been accomplished very readily because of the still prevalent German propaganda about American dyes, which has made the public extremely quick to condemn the latter even on suspicion. Happily, however, the past few months have witnessed a distinct alteration in this outlook; a few textile manufacturers, tiring of making "excuses," and discovering, it is likely, that these excuses were not swallowed so willingly by their foreign customers, saw the fallacy and the positive danger of the practice and forthwith eliminated it, until to-day, thanks to their pioneer work, the standards expected by the ultimate consumer are much higher and the balance of the trade is finding itself obliged to follow in their wake or be content with less business. Likewise, if the American manufacturer is to compete in the markets of the world he is forced to bring the quality of his manufactured article up to or higher than the level maintained by his foreign competitor—which to-day means pre-war standards.

In an ever increasing number of instances this standard can be obtained with American dyes, but since we are still weak on vat colors as compared with Germany it follows that in many other instances only the imported colors will enable the American textile producer to compete abroad, and if he cannot get these colors when he wants them he is being unnecessarily and wrongfully hampered.

It has come to the attention of The REPORTER that there has lately been additional dissatisfaction with the War Trade Board, at present in charge of the granting of licenses, over the question of obtaining dyes not available in this country. Such complaints have not been wanting in the past, but it had been the hope of this journal that the cause of them would have wholly disappeared by this time. Only recently, however, there arose a case where an American dyestuff dealer received an order from a customer for Patent Blue and, not being able to find it manufactured in this country, applied to the board for a license to import the necessary quantity. This was refused and the dealer referred by the War Trade Board to an American manufacturer who offered a Navy Blue which proved to be a mixture of Acid Black and Acid Violet. In a second instance an order for Rhodamine 6G was referred to a manufacturer unable to produce this color at all. Other recent examples could be cited.

It is understood that the War Trade Board, on being assured that the colors in question are unobtainable, will proceed to grant immediate permission for their importation—but in the meantime the customer has been subjected to a delay not at all conducive to pleasant thoughts about the licensing system, nor calculated to help his chances of doing business with the goods which he intended dyeing.

Such a delay is unfair to the dye user and unfair to the American dye industry, for it directly injures the interests of both. Moreover, it is unnecessary, for the War Trade Board has had ample time to verify the accuracy of claims submitted by dye manufacturers. The manufacturers in question, who professed to be able to supply these colors, are likewise at fault and should realize that they do themselves far more harm than good by creating dissatisfaction with a system upon which they must depend for their existence when Congress declares peace with Germany.

Because of the fact that greater interests are at stake than the welfare of this particular dye dealer or his his customer, or than those of both manufacturing and consuming industries put together, it is the duty of the War Trade Board to possess itself of such complete information that it can determine instantly and accurately whether a license should be granted in any case which may arise, and in the event of a refusal, be able to accompany the ruling with the names of all American concerns which can supply—not merely "talk"—the color wanted.

Wherever the responsibility lies, the trouble can be eliminated and *must* be eliminated. No plea that an honest mistake was made—which was undoubtedly the case—can soften the concrete fact that some man's business was unnecessarily harassed through inefficiency in the administration of the licensing system, which is one of the simplest and most easily administered systems ever devised. Better, even, to risk bringing into the country, for once, a dye already made by an American manufacturer, than that pro-German agents here should be furnished, gratis, with ammunition of that kind. The filling of a single order by Germany which could have been filled here will not destroy the American dye industry, but many repetitions of the other form of error, will. It gives the Washington lobbyists a chance, for once, to say "I told you so"; it puts into their hands the only real weapon they can ever hope to have among the artificial technicalities which they were obliged to invoke all through the Sixty-sixth Congress.

We trust that in future the War Trade Board will err on the other side, if err it must, and meanwhile respectfully submit to the trade that the Tariff Commission, with its special study and dearly-bought knowledge, will prove a better body for the administration of the law—and that it had better be put to work right away by the enactment of the Dye bill.

SUPPORT THE A. C. S. DYE DIVISION

WITH the spring meeting of the American Chemical Society but three weeks off, The Reporter desires to add its plea to that of the heads of the organization that there be as large an attendance as possible. Particularly upon our dye manufacturing readers do we urge this. The meeting will be held with the Rochester Section of the Society from Tuesday, April 26, to Friday, April 29, inclusive. Reduced railroad rates have been secured for the benefit of members. It is announced that all divisions except the Division of Fertilizer Chemistry will meet, and each division and section will have two full days at its disposal. The Division of Dye Chemistry, therefore, will not only be an active part of the meeting but should have ample time to do a service to the industry.

Secretary R. Norris Shreve, of the Dye Division, who can be reached at 43 Fifth Avenue, New York City, announces an interesting program. There ought to be enough in the statement that Representative Nicholas Longworth, father of the Dye bill, will speak, to insure a full attendance of dye men on this account alone. Mr. Longworth, we are told, will speak on the first regular day of the meeting, April 26. Secretary Shreve adds that as the dye industry is in a critical stage at present and is liable to be for some time, it behooves everyone connected with this industry to participate in the meeting for the mutual benefit of themselves and the industry.

We do not wish to omit mention of the fact that all those intending to present papers which have a popular appeal should send synopses of them as early as possible to the technical manager, A. C. S. News Service, 1 Madison Avenue, New York City. Synopses may be from 300 to 500 words in length and should be in as non-technical language as is consistent with accuracy and precision. It is the intention of the A. C. S. Service to forward all material of this kind to the press as nearly ten days in advance of the release date as possible, and in co-operating, authors will facilitate the work of the service and help to foster public interest in chemistry, making the work of the chemist better understood and appreciated. Dye chemists do not need to be told what publicity at this time will mean to the industry. In case you are unable to send in your synopsis before April 22 it may be forwarded to the technical manager of the service at the Hotel Rochester, where a press room will be maintained.

Any further details may be obtained from Mr. Shreve. This publication urges all dye chemists not already members of the society to apply at once for membership. The society is performing a wonderful work for the cause of chemistry in this country, and you are not doing your duty as a 100 per cent useful representative of your profession while you remain a social hermit. Plan to secure your membership without delay and, if possible, to attend the meeting. But at least you can support the work of the society by becoming a member.

A BRIEF RESUME OF WRITING AND PRINTING INKS

(*Continued from page* 21.)

the ink to penetrate into the paper by which means the ink surrounds the fibers of the paper and becomes firmly fixed. The addition of too much acid is dangerous, as an excess would eventually destroy the paper.

Because a steel pen is badly corroded by any particular ink does not of necessity condemn the ink, as this very quality is an indication that the ink would penetrate and be fixed upon and within the paper, and thus produce a permanent writing. Regarding the action of acid upon pens, some hold to the belief that the acid at first attacks the pen, but that the presence of the gum thereafter protects the nib and furher corrosion does not occur.

A certain ink company, using a minimum amount of acid in their inks, after having had numerous complaints regarding what was referred to as corrosion of the steel pens, increased the amount of free sulphuric acid and the complaints immediately ceased. What had been referred to as corrosion was, in reality, due to gumming of the ink, the lack of acid having induced the thickening of the ink.

Some manufacturers believe that acetic or hydrochloric acid is preferable to sulphuric acid, due to the fact that the two former acids are volatile, while the latter is non-volatile and remains upon and within the paper. It is an accepted fact, however, that some form of free acid is necessary in an ink.

Preservatives of Ink

It was early noted that gall-iron inks exhibited a decided tendency to develop mould, and for a long time this condition was accepted as unavoidable. Ferrous sulphate, in excess of what was necessary to combine with the tannin, was formed to exert a preservative action. The presence of this excess of ferrous sulphate, however, caused the writings produced therewith to quickly change to a brown color.

With the introduction of preservatives other than ferrous sulphate (green vitriol) it has been possible to reduce the amount of ferrous sulphate in many instances.

Other and better preservatives gradually came into use, such as carbolic acid, one pound of which will perfectly preserve 1,000 gallons of ink.

Salicylic acid, borax and alum have also been used, the two former ones quite successfully. The use of alum is not desirable, inasmuch as it affects steel pens. and unless an excess of acid is present in the ink, the alum would have a tendency to cause a deposition of the coloring matter.

The Color of Tannin-Iron Inks

Tanno-gallate of iron inks are prepared with or without added color, although those containing added color constitute by far the greater percentage.

The disadvantage in the use of tanno-gallate inks, containing no added color, lies in the fact that they do not produce a pleasing appearance when first applied. Such inks, if properly prepared, do however develop an excellent black within a few days after their application. The danger attendant upon the use of ordinary gall-iron inks, containing added color, is that improperly prepared inks could present a very beautiful appearance, when first applied, but would be utterly lacking in the time-resistant qualities which are of prime importance for any ink.

The Use of Added Color

The adding of color to a gall-iron ink is for the purpose of rendering the original writing more pleasing to the eye and is not carried out with the object of increasing the durability of the ink.

Such substances as madder and logwood, while added to inks to impart color, tend to mitigate against the permanency of tanno-gallate of iron inks.

Indigo, in the form of Sulphonated Indigo, has been used as an added color, with eminently satisfactory results, and does not affect the durability of the ink.

Certain of the acid blues and direct cotton blues are suitable for use as added color. The basic blues are unsuited due to the fact that they precipitate in the presence of tannin compounds. Colors must be used which are not affected by sulphuric acid.

Certain dyes have been recommended as suitable for ink making, both for production of black as well as colored inks, such compounds being nothing more nor less than solutions of dyestuff together with gum for thickening. Such dyes as Naphthalene Green V. Conc., Nigrosines, Cyanoles, Patent Blues, Acid Greens, etc., are said to be suited for production of such ink, as well as for use as "added color" in shading gall-iron inks.

Chemistry of Tannin-Iron Inks

The tannin compounds used in ink manufacture are derived from vegetable compounds such as Aleppo and Chinese galls, sumac, divi-divi, myrobalans, oak bark, etc.

Those tannin compounds which contain three hydroxyl groups in juxtaposition produce a blue black coloration in combination with iron salts, and this is the only type suited for ink manufacture.

Gallic acid [$C_6H_2(OH)_3COOH$], Haematoxyline [$C_6H_2(OH)_3.C_6H_4.C_6H_2(OH)_3$] and Gallotannic Acid [$C_6H_2(OH)_3CO.O.C_6H_2(OH)_2COOH$] are each excellent examples of the foregoing.

Blotting makes ink much more liable to fade. A good grade of blotting paper will remove, from a hard finish paper, about two-thirds of the amount of freshly applied ink. Such a treatment does not leave enough ink to penetrate between the fibers of the paper and the writing at best is more or less superficial.

The old type of tannin-iron inks, which immediately produced a black upon writing, were made by allowing the ink to remain exposed to the air, whereby a certain amount of oxidation took place, and the immediate black writing was due to the provisional color thus obtained.

This oxidized color did not penetrate into the fibers of the paper, but was only held on the surface due to the binding effect of the gum. The unoxidized portion of the ink penetrated the paper and there oxidized, thus producing a permanent black ink, whereas the upper portion could be easily removed by water.

A tanno-galate of iron ink which has been exposed to the air, and has evaporated, should never be diluted with water, because the particles of ink which have been injured will never again assume their original condition, the soluble ferrous gallate and tannate having been oxidized to the insoluble ferric condition.

Requirements of a Good Black Ink

To represent the best value, a black writing ink should possess the following characteristics:

It should be of such consistency that it will flow smoothly from the pen. It should be able to enter into the paper to such a depth that the subsequent oxidation will thoroughly fasten the particles upon and within the paper. It should not mould or thicken in the ink well. Writings produced therewith should dry quickly. Furthermore an ink to be desirable should produce writings which are proof against time.

Bleaching of Ink and Restoration of Same

When gall-iron inks are subjected to the action of certain chemicals, the color is apparently destroyed although in reality it may simply assume a form which is colorless and a subsequent chemical treatment may render the ink visible again.

This condition is one which even a clever forger is not always able to guard against. It may be that a forger will feel that an ink has been absolutely obliterated from a document which he wishes to alter, while as a matter of fact the base of the original ink may still be present, and upon further chemical treatment be rendered perfectly legible.

Sodium hypochlorite is used as the basis of ink eradicators, the ink first being treated with a weak acetic or tartaric acid solution and thereafter with sodium hypochlorite. Oxalic acid and sodium bisulphite as well as peroxide of hydrogen are also used, but remove the ink more slowly.

Gall-iron inks, which have been treated by the foregoing methods, may be rendered legible by allowing same to come in contact with the fumes of ammonium sulphide, by which means the iron base of the ink will be blackened due to the formation of iron sulphide. In certain cases the legibility may be restored by treatment with tannic acid when, if iron is still present, a black color will be produced due to the formation of tannate of iron. Further, if iron is present, a treatment with yellow prussiate of potassium, in the presence of acid, will yield a blue coloration.

The fading of iron-gall inks is largely due to the over-oxidation of the ink by means of which tanno-gallate of iron precipitates in the ink and when this ink is applied to paper there is an insufficient quantity of the active principle to give the required body to produce a permanent record.

According to "G. Martin" a gallo-tannate of iron ink which is said to yield good results may be prepared as follows:

42 ozs. extract of Aleppo galls in
120 ozs. water

Allow to ferment for ten to fourteen days. Add

2 ozs. Indigo Carmine, or other suitable blue dye.
5½ ozs. Ferrous Sulphate
2 ozs. iron previously dissolved in commercial acetic acid

Phenol may be added to preserve the ink.

According to "Whittaker," an ink, accepted as standard, is prepared as follows:

Dry pure tannic acid	23.4
Crystallized gallic acid	7.7
Ferrous sulphate	30.0
Gum arabic	10.0
Hydrochloric acid	2.5
Carbolic acid	1.0

Make up to 1,000 with water, adding sufficient soluble blue to make the first writing visible.

Powdered ink is now on the market and is prepared by carefully compounding the necessary proportions of tannin, sulphate of iron, and dyestuff, with a small amount of salicylic acid which acts as a preservative. These ink powders are held in small containers and when required are mixed with a definite volume of water.

Logwood Inks

Logwood inks are among the cheapest and easiest inks to prepare, and may be produced by the proper combination of a logwood (rich in haematoxylin) and iron salts, such an ink writing a greenish shade which assumes a black color within a short time. Logwood inks produced with alum show a violet-black color while logwood inks produced with chromium show a violet writing which rapidly changes to a black. Logwood inks have found wide application for use in schools, where, for much of the work, a really permanent ink is not required.

In case chromium compounds are to be employed, it is better to use the sodium compounds which are far more soluble than the potassium compounds. Furthermore potassium precipitates haematin from the solution, whereas sodium does not. Care should be taken that a proper amount of preservative be added to a logwood ink, as they are prone to thicken. This thickening has been, in some instances, ascribed to bacterial action due to the presence of excessive amounts of nitrogenous

matter in the logwood used in preparing the ink.

In logwood inks, where alum is used, there is grave probability that the coloring mater will be precipitated out as an aluminum lake with the subsequent weakening of the ink.

The Use of Colored Inks

During recent years the preparation of colored inks has been rendered extremely simple, due to the great variety of coal tar dyestuffs available. The durability of the inks is, of course, dependent solely upon the durability of the colors used.

The Eosines, appearing under different trade names, are the dyes principally employed for the preparation of the red inks. Cochineal, Madder, Saffron and Brazil Wood were formerly used for the preparation of red inks.

The other colored inks are made from the basic type of colors consisting of blues, violets, greens, etc., dissolved in the required amount of water, and thickened with gum arabic. As a general rule, the colored inks need no preservative, the dyestuff itself acting in that capacity.

(To be concluded.)

Technology of Chrome-Tanned Upper Leather—Part IV—Coloring and Finishing

Classification of the Various Coloring Materials Used on Chrome Leather—Showing How They May Be Best Applied. Outline and Suggestions on Finishing

By WILLIAM C. JACKSON

Colorist with J. S. Barnet & Sons, Inc., Lynn, Mass.

DOUBTLESS the department in which the processes used are the least understood by the average leather manufacturer is the coloring department. The ability to produce uniformity, clearness and the various shades as they come out is an art, learned only by long experience and a thorough knowledge of the dyestuffs and materials used. A good dyer can easily save his salary by his careful selection of dyes and processes, obtaining at the same time the desired results.

The field of leather coloring as compared with that of textile coloring is limited, due mainly to the fact that the dyeing cannot be carried on at a boiling temperature. The coloring matters used may be classified as follows:

1. Vegetable Coloring Matters.
2. Artificial Dyestuffs.
   - (a) Direct or Cotton Dyes.
   - (b) Developed Dyes.
   - (c) Acid Dyes.
   - (d) Basic Dyes.

Vegetable Colors

Among the vegetable coloring matters used on chrome-tanned leather are sumac, gambier, cutch, quebracho and fustic, all of which are rich in tannin and of an astringent nature. When used with salts of iron they produce tannate of iron and yield grays of varying intensity; with potassium titanium oxalate various tones of yellow are produced; while with bichromate of soda a brownish cast is obtained.

Their chief uses are as a vegetable retan to plump the stock and as a mordant for basic colors and should never be applied at a temperature of over 90 deg. Fahr. to avoid "piping" the grain. They are all very fugitive to light and fatliquor and lack fullness. Hypernic contains a red coloring matter and is produced from Nicaragua or peachwood and is closely allied to logwood, which formerly was extensively used for producing blacks but which now has been largely superseded by direct black.

Synthetic Dyestuffs

We will take up that branch of leather coloring covered by the artificial or synthetic dyestuffs. Before the war all these dyes came from abroad and each firm had its own names for its products. Many of these colors were chemically identical but had different standards of strength. Competition was so keen that in order to introduce his products, a salesman would cut his price and make it up with salt or dextrine or shade with a little blue to give the appearance of fullness, thereby making many different names or marks for the same dyestuff.

It was the writer's good fortune to have been in the employ of the National Aniline & Chemical Company,

Inc., during the period when it was building up its business and he had many opportunities for testing out these American-made products against the old pre-war German colors. He can truthfully say that in no instance did the German products excel;—in fact, in many cases, the American colors were superior in hue (purity of color), strength and fastness.

To accomplish in four years what it took Germany forty has been a stupendous proposition, nevertheless it has been accomplished by the aid of science and American energy—therefore let us give our American dyestuff industries all the encouragement we can, as it is only through their increased volume of business that we shall be able to obtain lower prices on their products. Buy your dyes direct from the manufacturer and limit your list of colors to the smallest number possible.

Theoretically, any color may be produced by the proper combination of the three primary colors: Red, yellow and blue but, practically, it will not work out thus, on account of the difference in affinity which certain dyes have for leather, also the action of the various materials used on the stock is different towards the various dyestuffs, and again no dyestuff is pure in hue: that is, identical with its spectrum standard. There is always present a secondary color or cast as. for example, Xylidene Scarlet is a red with a yellow cast and Azo Rubine Extra is a red with a bluish cast.

We will now take up the various classes of dyestuffs explaining the particular field to which each is best adapted, together with those dyes which give the best results on chrome-tanned leather.

Direct Colors

Direct or cotton dyes (salt colors) are as a rule azo compounds derived from benzidine or from bases which are similar to benzidine in their constitution. They are best applied direct to the neutral stock. They have little affinity for tannin, consequently cannot be used on a vegetable bottom. They are very soluble in alkalies and are therefore easily stripped by fatliquors. Many are sensitive to various reagents and will not hold up well on glazed leathers. They produce very brilliant colors and exhaust well and are frequently dyed in a salt bath. Erie Congo 4B; Erie Yellow F; Niagara Blue 2B and Erie Black GXOO are about the best representatives of this class.

Developed Colors

Many of these direct dyes contain a free amido group, which is capable of further diazotization. When this is the case, the dyed stock may be further treated with nitrous acid, which converts the amido group into the diazo group and when treated with any naphthol or amine forms a very fast and full color. This method is used extensively in making Black Ooze calf, which may then be topped with a basic black. Among the dyes used in this method are Diazine Black H Extra and Erie Green M. T.

Acid Colors

Acid dyestuffs are the sodium salts of the sulphonic acids as well as of such dyes as certain phenol groups associated with nitro groups. They will affix themselves directly on the fiber but will exhaust better and produce fuller colors if the dyebath is slightly acidulated with sulphuric acid. They will dye both chrome and vegetable tanned leather but tannin acts as a retard and consequently if the chrome stock is previously treated with a tannin compound, the dyeing will be more level but not as full nor as brilliant. Acid colors will precipitate basic colors and are therefore frequently topped with basic dyes, thereby producing very fast and full shades. The best acid color to use as a bottom for the prevailing brown shades of upper leather is Resorcin Brown R on a vegetale bottom and top with the proper combination of the following basic colors:

Bismarck Brown R,
Safranine A,
Victoria Green WB,
Auramine O.

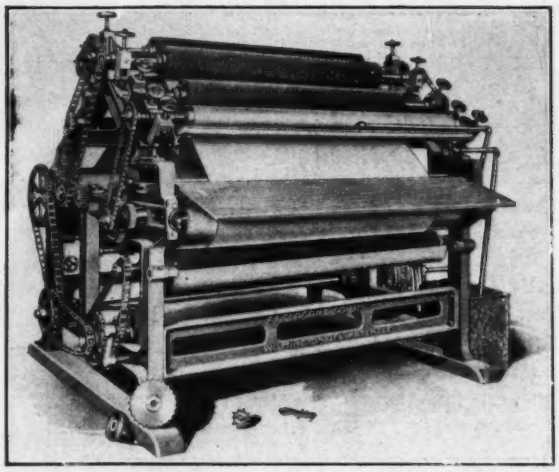
For the Cordovan or Tony Red shade, substitute part of the Resorcin Brown R with Fast Red S. Conc. and replace the Auramine O in the top color with Methyl Violet.

Among other acid colors used extensively on leather are Metanil Yellow, Orange A, Buffalo Black N. B. R. and the Nigrosines.

Basic Colors

Basic dyes are salts, usually hydrochlorides but sometimes sulphates or oxalates of dye bases. They are not substantive to chrome leather and must be applied on a tannin mordant, which has been fixed with potassium titanium oxalate, bichromate of soda or tartar emetic. Basic dyes produce very full shades and are fairly fast to fatliquor, especially when fixed with titanium or chrome, although Chrysoidine is very fugitive in this respect. Basic colors have a tendency to bronze, especially Fuchsine and Methyl Violet and should be used sparingly. Before the war phosphines were very popular on account of their fastness and level dyeing properties but with the advent of the pigment finishes, they have been largely replaced, on account of price, by mixtures of Bismarck Brown R, Safranine A, Victoria Green W. B. and Auramine O which will produce almost any tone of brown or red.

Care should be taken to thoroughly wash stock colored with basic dyes previous to the fatliquoring to free the stock of any liberated acid which would form fatty acids with the fatliquor and produce greasy spots on the finished leather.



Crown Band Seasoning Machine
F. F. Slocomb Co., Inc.

After fatliquoring the stock should be thrown into a tub of lukewarm water and then horsed up grain to grain and allowed to stand over night and then set out, shanked and sent to the dryer or hung on hooks in a hot room until dry. It should then be piled down in a cold room for ten days and allowed to mellow before sending to the finishing department.

Finishing

With finishing as with coloring it is a waste of time and space to attempt to lay out any definite procedures on account of the ever changing demands of the trade. Furthermore, a process that would work out well in one factory would not produce the desired results in another. Therefore a general outline with a few helpful suggestions is deemed more expedient.

The stock from the dryer is in a hard and more or less wrinkled condition and is said to be "in the crust." The method employed to soften and open up the fibers and make the leather supple is to put it into damp sawdust where it will absorb the moisture and be in a suitable condition for staking, which consists in holding the skin between a set of reciprocating jaws and working it around until all the fibers have been loosened.

In preparing the sawdust care should be taken not to have it too wet. A very good way to test it is to squeeze a handful, and upon releasing it the moisture should just be perceptible in the palm of the hand. Put the stock in, two skins at a time, grain to grain, cover well, and so on until all are in. Stamp down well, leave over night and next morning stock should be ready for staking. Too much stress cannot be laid on the condition of the dust, for if too wet the stock will wet through on the flanks and stain and will be hard off the tacking frames. After the stock is staked it will be helped by knee-staking the shanks and then tacking on frames, keeping the temperature of the tacking room between 90 and 100 deg. Fahr. When dry, pull off and a much better "break" may be obtained by putting back into nearly dry sawdust for a couple of hours and then restaking on a clamp staking machine. The leather should now be brushed, trimmed and sorted into the various grades, weights and finishes.

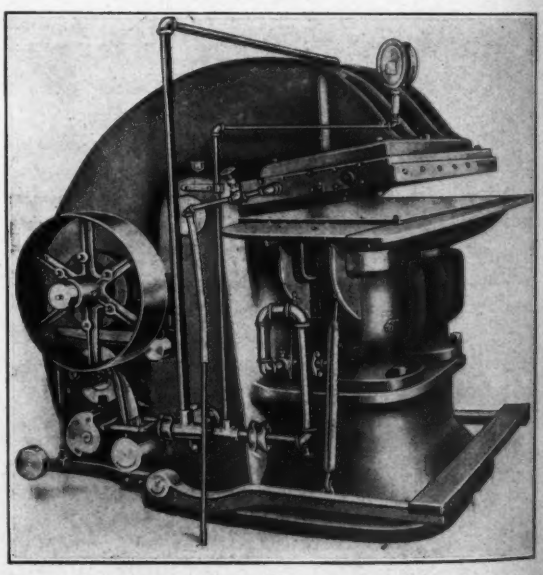
For a bright finish it is generally necessary to put on two coats of pigment by machine and when thoroughly dry, glaze and then give a top coat by machine and glaze again. This is followed by a final top coat put on by hand and plate when thoroughly dry. Calfskins give better results by being plated on a Turner hydraulic press but side leather comes out better on a Sheridan press.

For a semi bright finish one glazing is sufficient and that should be after the first top coat. An ironing by hand is often beneficial and should be the last operation before sending the stock to the measuring machine.

Pigment finishes, of which there are many on the market, are composed of earth pigments held in suspension by pastes made up of such materials as Carnauba wax, soap, casein, shellac, Irish moss and flaxseed. These finishes are diluted to the proper consistency and toned with aniline dyes to obtain the desired color.

We have followed the process of making leather through the several departments and, to convert the raw stock with its various imperfections into a uniform piece of leather, which will pass the critical inspection of the leather buyer, is no mean task and requires eternal vigilance on the part of the manufacturer.

(*Concluded.*)



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MEN OF MARK
in the
DYESTUFF FIELD

Walter S. Williams
Chemical Engineer
Mt. Hope Finishing Co.
North Dighton, Mass.

WALTER S. WILLIAMS was born December 12, 1872, at Haverhill, Mass., and received his early education in the schools of that town and of Nashua, N. H. He graduated from the Massachusetts Institute of Technology in 1895, receiving the degree of chemical engineer, and subsequently remained thereat for one year as instructor in industrial chemistry and textile coloring.

Mr. Williams' first industrial position was as assistant superintendent of the H. N. Slater Cambric Works, at Webster, Mass. After three years in this position he became chemist of the Arnold Print Works, at North Adams, Mass., which position he occupied for eleven years, during the latter part of his time assuming the added duties of purchasing agent.

Upon leaving the Arnold Print Works Mr. Williams practised for some time as consulting chemist and engineer for textile mills, being associated for awhile with Arthur D. Little, Inc., of Boston. In 1914 he became chief chemist for the U. S. Finishing Company, in which capacity, during the early days of the war, he co-operated with various dyestuff manufacturers in selecting and producing necessary colors for cotton dyeing and printing.

In 1917 Mr. Williams became chemical engineer at the Mt. Hope Finishing Company, which position he still holds—among his duties being the purchase of all dyestuffs and chemicals. When the United States entered the war he assisted in developing the necessary sulphur colors for the wide, heavy ducks and similar fabrics required by the Ordnance Department.

Mr. Williams has devoted lifelong study to the chemical engineering problems associated with bleaching, mercerizing, dyeing, printing and finishing of cotton and cotton-silk fabrics, and has given especial attention to the testing and evaluation of the dyes and chemicals required for these fibers. He has been a prominent contributor to the technical press on various textile subjects.

INQUIRY DEPARTMENT

All classes of chemical work or advice relating to artificial colors, natural dyestuffs, dyewoods, raw materials, extracts, intermediates, crudes, or dyeing chemicals and accessories in general, will be carried out for readers and subscribers of the AMERICAN DYESTUFF REPORTER by this department.

Inquiries of a minor character will be answered on this page, while major matters involving personal investigation, analyses, perfected processes and working formulas, will, if desired, be treated confidentially through the mails. In answering inquiries which, by their nature, require reference to the products, processes or apparatus of some particular manufacturer we aim to be absolutely impartial. We refer the inquiries to specialists whom we believe to be best qualified to answer them intelligently, and must disclaim responsibility if their reports show unintentional bias. All questions, materials for analysis or letters leading to the opening of negotiations for special work will receive prompt attention if addressed to Inquiry Department, American Dyestuff Reporter, Woolworth Building, New York City.

R. L. B.—*Question*—Will you kindly advise me who in America is making Soluble Blue, red and green shades?

Answer—Soluble Elue is at the present time being manufactured by the National Aniline & Chemical Company, Sherwin-Williams Company and Dicks-David Company, to our knowledge, and there may be others of whom we are not aware.

J. C.—*Question*—Will you kindly advise me as to what industries are the chief consumers of Methyl Violet and about how much of it is used in this country annually? I should also be glad to know who is now manufacturing it in America.

Answer—This product is sold in three forms, crystals, lump and base, the crystals being the form usually used in America and the other two being used generally for export purposes, particularly the Far East.

Methyl Violet is used in the textile, paper, leather and ink industries, a large quantity being used both for typewriter ribbons and the manufacture of indelible pencils. During the last pre-war year a total of 255,063 pounds was imported, according to the records of Dr. Norton of the Department of Commerce. Various brands of this product are covered in the last edition of Schultz & Julius Farbstofftabellen under No. 515.

At the present time Methyl Violet is being manufactured in America by the National Aniline & Chemical Company, E. I. du Pont de Nemours & Co., Sherwin-Williams Company, Tower Manufacturing Company, H. A. Metz & Co., Dicks-David Company, and perhaps by other concerns with which we are not acquainted. Several importers are also offering this product.

D. K. M.—*Question*—You will greatly oblige us by advising if Magnesium Sulphate is used to any extent in connection with the dyeing of Sulphur Black on cotton hosiery, and if so, state how same is applied and results otained.

Answer—After careful investigation we are of the opinion that the use of magnesium sulphate is very limited, if used at all, in connection with the application of Sulphur Black on cotton hosiery. We do not find any literature on this subject nor have our inquiries directed to various mills using Sulphur Black discovered any who are employing magnesium sulphate in any way. One of the large manufacturers of Sulphur Black has, at our request, made a series of tests employing magnesium sulphate and reports to us that he finds no occasion to recommend its use.

H. C. Co.—*Question*—Will you please advise us of the nature and uses of Osage Orange Extract as a dyestuff?

Answer—Osage Orange Extract is a vegetable dyestuff very similar to fustic, yielding a yellow color. It is dyed in connection with a mordant, is particularly suitable for wool dyeing and, in certain cases, for silk. It can be used in almost every instance where fustic is employed.

The Osage orange tree grows along the Mexican border and the Osage orange extract as a dyestuff was developed by the United States Department of Agriculture in order to find a use for the chips and trimmings of Osage orange wood which is used largely in the manufacture of cart wheels in the very dry desert territory.

Review of Recent Literature

World Disarmament and the Master Key Industry. A collection of notable testimony bearing upon the role of the coal-tar chemical industries in warfare; 52 pages, 9x12; New York, American Dyes Institute, 130 West Forty-second Street.

At last the leading facts in the case of the dye industry vs. Government inaction are to have a vehicle for presentation to the public in their proper form, compactly and completely. Whereas heretofore they have had to depend on paper-covered pamphlets or typewritten circular letters, which, after all, compel anything but satisfactory attention, they may now be sent forth with full assurance that they will command respect and gain a hearing from many whose invariable custom it is to consign anything that looks like a propaganda-bearing folder, circular, dodger or what not, to the waste basket.

The compilation of these facts, of which the public knows so little, may be regarded as most fortunate and timely, and the American Dyes Institute has well served the needs not only of the dye industry, but of the entire country, for it has been demonstrated beyond doubt that the only way to overcome the political cowardice of our servants in Washington is by the overwhelming pressure of public opinion. As a moulder of that opinion the work under discussion should prove extremely potent if rightly applied. A number of months ago this department would have expressed a hope to see it in every textile or other dye consuming factory in the country; now, however, we would like to see it on the desk of every editor in the country.

accompanied by a supplementary letter asking for expression of the facts in the editorial columns and suggestions to readers that their representatives in Washington be advised of a strong local sentiment in favor of adequate protection for the dye industry. The dye consuming industries know the story by this time, and apparently can do little more to offset the efforts of the strongly organized pro-German lobby which is operating in Washington to cheat them out of an independent domestic source of supply. Further efforts to startle Congress from its apathy must come from citizens of the United States, as such—in other words, the VOTE (set in capitals because no Congressman ever thinks of it except as in capitals). And, make no mistake about it, the sum total of the influence of the editors is enormous. One of the gravest mistakes which one seeking support for his particular cause can make is to underrate the powers of the editor of the small "country" newspaper, published weekly. We have not been apprised of the plans for distributing this compilation, but in our opinion the smaller towns should be covered as completely as practicable.

The work is dedicated to the joint propositions that if we lose our new dye industry we must either remain armed to the teeth or accept the certainty that we cannot resist an attack by any dye-making country, and that nothing short of direct measures of exclusion can furnish the necessary shield for its protection. "The American Dyes Institute presents this book to the American people," states the introduction. It is to be earnestly hoped that it will indeed do so, to the limit of that organization's ability. Once made to understand the message which the book contains, the American people will do the rest.

Excellent "talking points" for editors are contained in the initial chapter, which bears the title of the entire work. It makes very clear the fact that "in a disarmed world the dye-making countries will reign supreme." Navies and armies can be limited, but "no nation will consent to any course of action, however uniform and universal, which decreases its safety, its relative power of resistance." Chemical warfare being the order of the day, a nation equipped with a self-sustaining dye industry is all but equipped for chemical warefare on a colossal scale—without making any drain on the public treasury meanwhile. "Already the chemists, to some extent without the aid of any existing weapon, and to an overpowering extent in conjunction with the older equipment, can provide an attack of hitherto unparalleled efficiency, while they alone can offer any adequate means of resistance." If every German munition works were destroyed, "the German dye industry could yet, partially at least, arm half the world." Hence, disarmament in its generally understood form will be out of the question for any country not so equipped.

Much of the material which the book contains has already been given to REPORTER readers. For instance. there are selected portions of the Watson speech, the Frelinghuysen speech, the Knox speech and the Nugent speech made in the United States Senate. There is the original majority report of the House Ways and Means Committee and also of the Senate Finance Committee, and likewise the important articles on "Chemical Disarmament" by Major V. Lefebure, and "The Encirclement of Germany's Enemies by the Dye Industry" from Chapter II of "The Great Adventure of Panama," by Phillippe Buneau-Varilla. Leading the van is "Fighting with Fumes," consisting of extracts from chapter XII of Dr. Edwin E. Slosson's "Creative Chemistry," which begins: "The Germans opened the war using projectiles seventeen inches in diameter. They closed it using projectiles one hundred millionth of an inch in diameter. And the latter were more effective than the former." This selection is an excellent one to use for an "opener," since it at once acquaints the reader with the nature of chemical warfare and prepares his mind for what is to follow.

An effective portion of the book is devoted to extracts from the testimony of army and navy officers and scientists, including Major-General W. L. Sibert, of the C. W. S.; Rear Admiral Ralph S. Earle, U. S. N.; Brigadeer-General Amos A. Fries, U. S. A.; Colonels C. T. Harris and J. H. Burns, U. S. A.; Dr. Van H. Manning, Department of the Interior; Dr. Marston Taylor Bogert, Columbia University; Dr. Julius Stieglitz, University of Chicago and former president of the American Chemical Society, and Charles H. La Wall, U. S. Pharmacopoeia. There are also extracts from the *Congressional Record* and a section devoted to comment culled from sixty-odd trade journals, newspapers and consumer periodicals.

One of the most impressive articles in the collection is that of Dr. Charles H. Herty, editor of the *Journal of Industrial and Engineering Chemistry*, from which we cannot refrain from quoting:

". . . We are slipping back, back to the dull routine of pre-war days, to unaccustomed, petrified thoughts of war-making. Unceasing effort for more than a year was required to arouse a dynamic interest in gas warfare, after we were actually in the war. Many American lives were lost because of that delay. . . . To-day the army has practically no modern gas masks. The same is true of the national guard. Through the army and navy appropriation bills the House of Representatives has set aside a total of $724,000,000 for our fighting forces and of this amount only two-tenths of one per cent is availale for gas warfare, which was responsible for one-third of our casualties."

Something is urgently needed to restore the mental balance of our friends in Washington. Widely distributed, we believe that this book will have sufficient effect on the press, and in turn on the public, to bring about an overwhelming protest. We sincerely recommend that every friend of protection for the American dyestuff industry take it upon himself to secure a copy and bring it to attention of all who are in any uncertainty as to the necessity of protective legislation.

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